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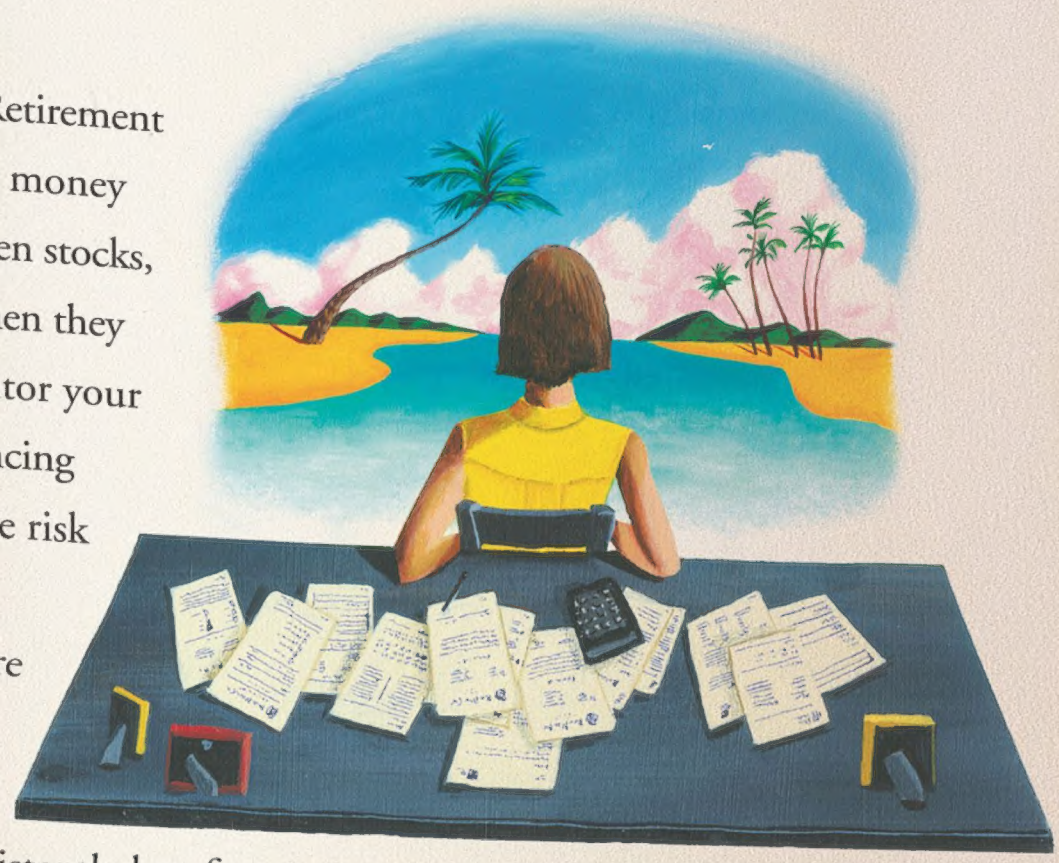

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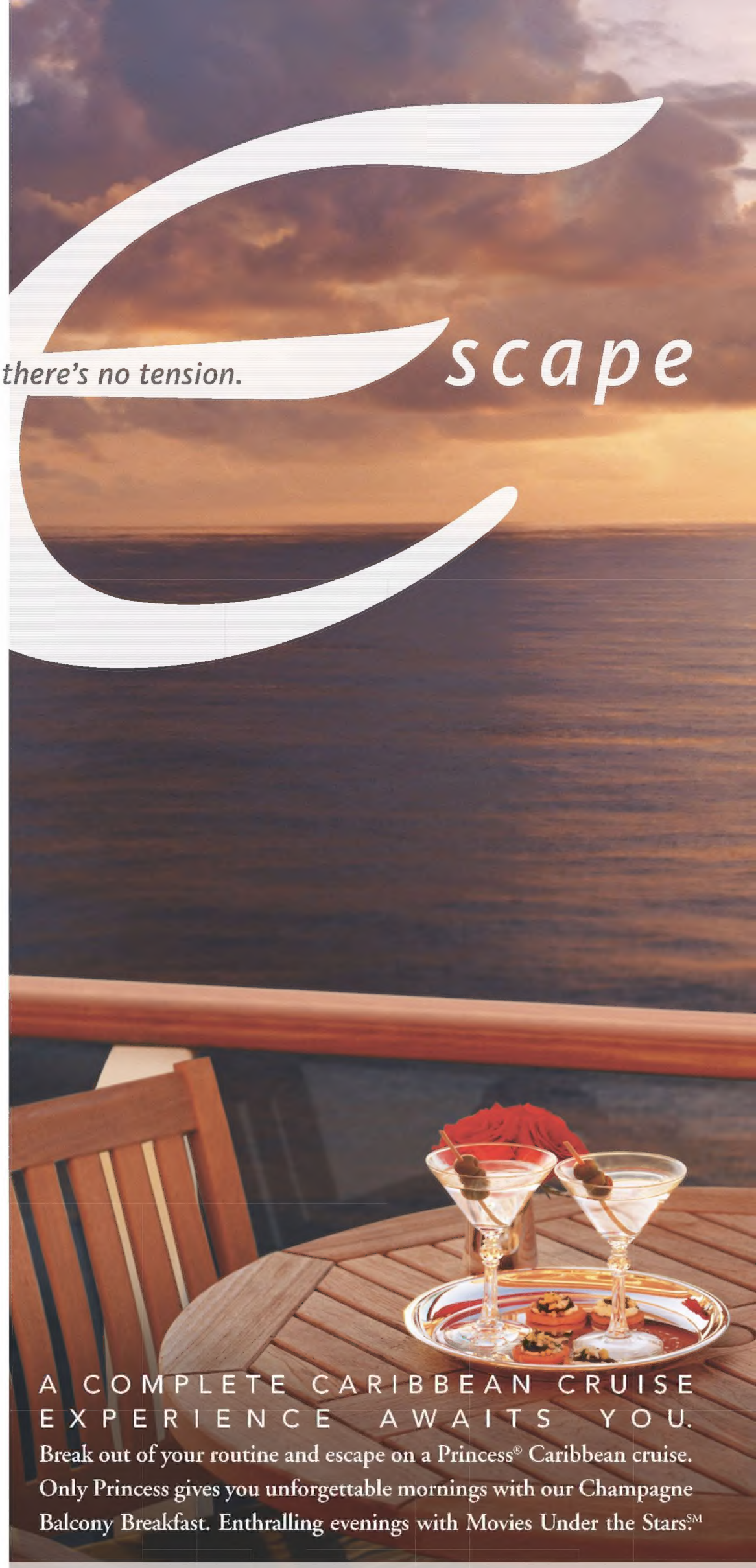

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What happens to the millions of computer monitors, cellphones, TVs and other electronic devices that Americans discard each year? It's not a pretty picture. (But *ours* are)

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BY KAI BIRD AND MARTIN J. SHERWIN

"The mere prospect of a chance encounter with a shark is nightmarish. Never mind that on average, for every American killed by a shark, 37 are killed by snakes and 45 by pet dogs."

—"SHARK," PAGE 42

THIS PAGE: There will be "serious and unforeseen consequences," says fisheries expert Ramón Bonfil, if shark populations don't rebound. (A blacktip shark patrols the waters at Atlantis Aquarium, Paradise Island, Bahamas.) Photograph by Andrea Pistolesi / Getty Images.

COVER: In the end, J. Robert Oppenheimer sided with those who "emphasize the opportunity of saving [Allied] lives by immediate military use" of the bomb. ("Fat Man" explodes over Nagasaki, August 9, 1945.) Photograph from Bettmann / Corbis.

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"Furman has set dozens of other world records, including Most Jumping Jacks (27,000 in 1979; 33,000 in 1982) and Longest Time Yodeling (27 hours)."

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THIS PAGE: On April 26, 2001, Ashrita Furman balanced 75 beer glasses on his chin for 10.6 seconds, shattering his own world record of 62 glasses, set in 1998.

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EDITOR'S NOTE

WAR STORIES

REMEMBERING THE SOUND AND FURY—AND THE JOY—OF THE END OF WORLD WAR II **BY CAREY WINFREY**

OUR COPY CHIEF, Karen Larkins, put together the special package about the end of World War II ("It's Over!" page 52). She got the idea during a Sunday brunch with her mother, Patricia, who told Karen that she had been on a train traveling from Pennsylvania to California that August 15 sixty years ago. When the train pulled into Baird, Texas, Patricia remembered, she saw people celebrating on the platform. Karen says, "I thought it would be fascinating to solicit letters from those SMITHSONIAN readers who remember the day, and it dawned on me that we would get letters from all over the world."

Larkins: "So many of our readers had experienced such amazing things."

So in this space this past February, I invited readers to tell us "where you were and how you reacted to the news" of the war's end. More than 400 of you responded, not only with your recollections but with photographs, telegrams, medals and other memorabilia.

In the course of the project, Larkins got to know many of our readers on a first-name basis. "I even got to know their children," she says, "because they, too, were invested in talking to me or sending materials. So many of our readers had experienced such amazing things. And they were such good writers. The letters came to us in excellent shape."

Larkins says one of the most remarkable letters was from Sgt. Richard Hagerman to his fiancée. Another, from Mississippi native Odean Fondren, recounts how her husband, Aubry, had been killed in action in Italy somewhere near Rome. "After all these years," says Larkins, "it's clear that the emotions are still fresh."

MARTIN J. SHERWIN, who with coauthor Kai Bird wrote the acclaimed biography of Robert Oppenheimer, *American Prometheus*, from which our story ("Building the Bomb," page 88) is adapted, began his research about the man behind the atom bomb in 1979, near Cowles, New Mexico.

"It was from there in the summer of 1922, that Oppie, as many of his friends came to call him, first explored the beautiful Sangre de Cristo mountains. My destination, several hours by horseback over the 10,000-foot summit of Grass Mountain, was the spare cabin on 154 acres of spectacular mountainside in which Oppie had vacationed for many years. The trip had two purposes. The first was to absorb in a small way the experience that Oppie had shared with his friends—the liberating joy of riding on horseback through this awesome wilderness. The second was to talk with his son, Peter, who was living in the family cabin. Both missions accomplished, the biography fell into place . . . a mere 25 years later!"

BRIAN NOYES

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The Price of Ambition

From the beginning, the cost of increasing and diffusing knowledge exceeded even Smithson's generosity

JOSEPH HENRY, the Smithsonian Institution's first secretary (1846-1878), had a problem. Before coming to Washington, D.C., he had taught physics at Princeton University and achieved international renown for discovering scientific principles that led eventually to the development of the telegraph, electric motor and transformer. But managing the operation of the Smithsonian would require much more than scientific insight; to succeed, Henry would need to be a consummate diplomat and negotiator.

The problem was money. In 1829, James Smithson, a wealthy British scientist, died. He had made the United States, a country on a continent he'd never visited, the beneficiary of his considerable fortune and asked that his bequest be used to found an "Establishment for the increase & diffusion of Knowledge." When Congress created the Smithsonian, it also designated the Institution as the repository of the government's collections.

Henry, the Smithsonian's first secretary, needed the skills of a diplomat (the Castle, 1867).

Henry quickly realized that the Smithsonian couldn't accomplish the ambitious agenda imagined for it by relying solely on the Smithson bequest. The construction of the Castle, the Institution's new first building, had been a costly undertaking. Henry worried that just maintaining the Castle would sap support for scientific inquiry and the publications he wanted to distribute to fellow institutions around the globe.

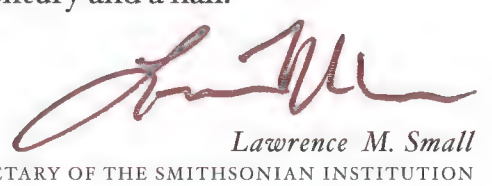
At the same time, a home was needed for the collections of the United States Exploring Expedition, a U.S. Navy voyage that circumnavigated the globe between 1838 and 1842, amassing several thousand animal specimens, 50,000 plants, thousands of shells, rocks and other geological specimens, as well as jars of seawater. In all, the collections weighed almost 40 tons; already, some of the rarest and most valuable natural history specimens, including exotic tropical birds and insects as well as anthropological treasures from the South Seas, were in need of expert attention.

In addition, the Smithsonian had accepted the many Native American artifacts and newly discovered plants, animals and mineral specimens acquired by military and civilian exploring and surveying expeditions that crisscrossed the American West. Cataloging and caring for so much of such value was neither a simple nor an inexpensive proposition.

One letter from Henry describes the purchase of 12,000 glass jars just to prepare for the storage of the specimens suspended in alcohol. As he wrote in one report: "Few persons have an idea of the labor, constant care, and expense which attends the proper preservation of a series of objects of natural history." Henry argued persuasively that the Smithsonian needed money to transfer and arrange the nation's collections and then additional funds each year to look after the objects.

Congress agreed and, in 1857, appropriated the funds, creating a hybrid partnership—part public, part private—in which taxpayers and donors alike can continue to take pride. Our collection of biological specimens represents the world's most complete aggregation of DNA samples. Our holdings of American cultural and historical artifacts are the most significant on the planet. Our 15 museums, which display these collections for the public and preserve them for researchers, are visited by almost 30 million people each year, roughly 10 percent of the population of the United States.

Very fortunately, Joseph Henry turned out to be as talented a diplomat as he was a scientist, and he was able to chart a steady course for the Smithsonian. As a result of his foresight and Congress's understanding and continued support, the Smithsonian's unique partnership has served the nation well for almost a century and a half.



Lawrence M. Small
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JEFF TINSLEY, S.I., SMITHSONIAN INSTITUTION ARCHIVES (2)

LETTERS

Readers respond to the June issue:

BORDER DISPUTE

"CROSS PURPOSES," which romanticizes and glorifies the lives and successes of illegal immigrants, does ill service to the realities of life in the border states. In California, Arizona, New Mexico and Texas, illegal immigrants are overwhelming the public services, overcrowding the schools and forcing financial disaster on hospitals. They are trampling fragile ecosystems and dying horrible deaths in the desert, or in the backs of smugglers' overcrowded, airless trucks. While the money that working immigrants send "home" may be supporting the Mexican economy, it is money taken out of the American economy. They are depressing the wages of, and taking jobs from, those who are here legally. It is not the pretty picture that you paint.

CYNTHIA P. YANDELL
DALLAS, TEXAS

JONATHAN KANDELL glosses over the criminal underworld of the "coyotes" who move immigrants across the U.S.-Mexico border. Many of the smugglers are also involved in illicit drug trading. I am a third-generation border resident and see the reality of illegal immigration every day. Border residents are often portrayed in the media as racist xenophobes. Yet many of us have Mexican lineage or relatives. To hate Mexicans would be to hate ourselves. The vast majority of those who move illegally over our southern border are honorable and hardworking people. But a vast criminal human- and drug-smuggling system profits the most from illegal immigration.

RICHARD MCEVER
SIERRA VISTA, ARIZONA

IT IS NOBLE that immigrants from Mexico support their family members back home, but it's unfortunate that the Mexican government does so little to discourage illegal immigration. The lack of capital investment in Mexico to create jobs and improve education, health and the environment means the United States will continue to be flooded with Mexicans leaving their country who would rather stay.

CARSON WATSON
SAN RAFAEL, CALIFORNIA

KEEPING TIME WITH EINSTEIN

ALBERT EINSTEIN ("The Year of Albert Einstein") routinely practiced the violin. My friend, the great American tenor Jan Peerce—several of whose performances I conducted and whose musical training was originally in the violin—and his wife, Alice, were neighbors and good friends of the Einsteins in Princeton. The boys got together frequently to play duets. Jan once confided, however, that he did not really like to play with the great physicist, because Einstein "didn't know how to count."

FREDERIC BALAZS
SAN LUIS OBISPO, CALIFORNIA

NOT A PRETTY PICTURE

I READ "Hazy Days in Our Parks" with much sadness. We have visited the national parks since 1952. The pictures we took on those early visits, when our children were young, were clear and crisp. The pictures we have taken the past ten years or so, when we've gone back as an older couple, show hazy air.

MARVIN AND MARDONNA RICHEAL
DE WITT, IOWA

THE WRONG "DEEP THROAT"

I WROTE IN THE December 2003 issue ("Who Was Deep Throat?") that the news reporting class I teach had deduced that Deep Throat, secret source of *Washington Post* reporter Bob Woodward during the Watergate crisis that began 33 years ago, was Fred Fielding, chief deputy counsel to President Richard Nixon. We were wrong.

This past May, Mark Felt, then second in charge at the FBI, acknowledged that he was Deep Throat, and Woodward confirmed it. Why had our class project ruled out everyone in the FBI? For one thing, in Woodward and Carl Bernstein's book *All the President's Men*, Deep Throat made comments (about gaps in the Nixon tapes) that were similar to comments that also appeared in the *Post* but were attributed to an anonymous White House source. In addition, Deep Throat's information contradicted some FBI reports. Moreover, Deep Throat's inside information was conveyed to Woodward until November 1973, according to *All the President's Men*, but Felt left the FBI in June 1973.

Our class did a good job of gathering evidence. But we committed the huge error of misinterpreting that evidence. I have promised in the many interviews I have recently given to reporters that my class would next investigate how we went wrong. Did we learn from the experience? Probably more from being wrong than if we had been right.

WILLIAM C. GAINES
DEPARTMENT OF JOURNALISM
UNIVERSITY OF ILLINOIS
URBANA-CHAMPAIGN, ILLINOIS

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August 1970
THE YEAR WE WERE BORN

A LOOK BACK AT THE WORLD IN SMITHSONIAN MAGAZINE'S FIRST YEAR

CELEBRATING 35 YEARS SMITHSONIAN MAGAZINE

WHERE ARE THEY NOW?

ROGER MILLS

A GROUNDBREAKING MARRIAGE

"I finally asked her out," says Roger Mills of his courtship with Berta Linson. She became his bride August 2, 1970.

"IT WASN'T LIKE a *Guess Who's Coming to Dinner* kind of thing," says Roger Mills today, referring to his first meeting with his future in-laws. Mills, who is white, and Berta Linson, who is African-American, were married August 2, the first state-sanctioned interracial couple in Mississippi (though the state statute forbidding "the marriage of a white person and a Negro" was not repealed until 1987). The outcry sparked by the wedding was so great, Mills recalls, that "a caravan of cars accompanied us for a mile or so" as soon as they were pronounced man and wife.

Mills, 59, and Linson, 56, had three children; the couple divorced in 1988. He works as a civil rights attorney and she as a special education teacher, both in Atlanta. —*MIMI KIRK*

Dallas businessman Abraham Zapruder, who filmed the assassination of JFK on his 8 mm camera, dies of cancer August 30 at age 66. In 1969, testifying at the trial of accused conspirator Clay Shaw, Zapruder recalled: "I was extremely shattered. I kept on saying, 'They killed him, they killed him.'"

IN THE NEWS

On August 28, eight years after writer Rachel Carson warned of the dangers of DDT in the *New Yorker*, the Agriculture Department announces restrictions on the use of the pesticide on 50 types of fruits and vegetables, forest trees, lumber, livestock and buildings. Believed toxic to humans, DDT was officially banned in the United States in December 1972. Today, some environmental groups protest its use in helping to eradicate malaria in the Third World.

President Joseph Mobutu of the Congo (later Zaire and today the Democratic Republic of Congo) arrives in Baltimore August 3 for a 12-day visit with U.S. officials and business leaders. Secretary of State William Rogers lauds the African dictator as a soldier-statesman "in the same mold as Washington and Eisenhower." Ousted by Tutsi rebels and others in May 1997, Mobutu died in exile in Morocco later that year at age 66.

THE LIST

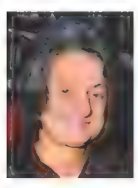
1970 Emmy Awards

Best New Series: ***All in the Family***
Dramatic Series: ***The Bold Ones: The Senator***
Comedy Series: ***All in the Family***
Actor, Drama: Hal Holbrook, ***The Bold Ones: The Senator***
Actress, Drama: Susan Hampshire, ***The First Churchills***
Actor, Comedy: Jack Klugman, ***The Odd Couple***
Actress, Comedy: Jean Stapleton, ***All in the Family***

COMINGS & GOINGS

BORN:
M. Night Shyamalan
Film director
August 6

BORN:
Claudia Schiffer
Model
August 25



"Women's consciousness is changing, and it's irrelevant to me whether 500 or 5,000 women turn out. This is already a huge success because the women's movement is going to be the biggest movement for social and political change in the 1970s."

—**BETTY FRIEDAN**, ON MARCHES PLANNED FOR THE 50TH ANNIVERSARY OF WOMEN'S SUFFRAGE, IN THE AUGUST 27 ***NEW YORK TIMES***

"They're really boorish, horrible men and I don't think I'd want to have anything to do with them."

—**VICE PRESIDENT OF NOW LUCY KOMISAR,** AFTER GETTING A STEIN OF ALE DUMPED OVER HER HEAD AT THE PREVIOUSLY ALL-MALE MCSORLEY'S OLD ALE HOUSE IN NEW YORK CITY, IN THE AUGUST 11 ***NEW YORK TIMES***

UPI / CORBIS; ROGER MILLS COLLECTION; RIGHT: ZAPRUDER FILM / SIXTH FLOOR MUSEUM AT DEALEY PLAZA (2); AP / WIDE WORLD PHOTOS; BETTMANN / CORBIS; RUNE HELLESTAD / CORBIS; MITCHELL GERBER / CORBIS; BETTMANN / CORBIS; NEAL BOENZI / NEW YORK TIMES

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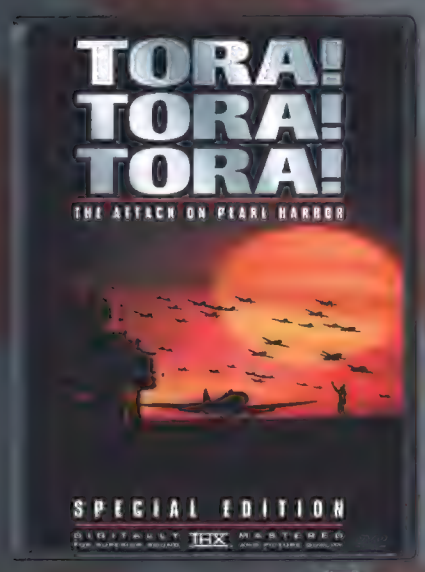

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INDELIBLE IMAGES

FOOTLOOSE

THE IMAGE OF BRUCE McCANDLESS' SPACEWALK TWO DECADES AGO STILL AMAZES. IT WAS THE FIRST UNTETHERED WALK EVER—AND WAS AMONG THE LAST **BY ANNE BROACHE**

"We're opening a new frontier in what man can do in space," McCandless said when President Reagan telephoned the space shuttle.

ROBERT GIBSON / NASA

IT MAY NOT HAVE BEEN a giant leap for mankind, but Bruce McCandless II took an awfully big step on February 7, 1984, when he ventured out of the shuttle *Challenger* and became the first person to fly freely in space, untethered to a craft. Strapped into a jet pack, McCandless traveled more than 300 feet from the mother ship, with the blue Earth glowing 150 nautical miles below. Inside the shuttle, Robert Gibson peered through a Hasselblad camera lens. "Holy smokes," Gibson recalls thinking, "what an image this is."

Today, the photograph that Gibson took is as astonishing as ever, ranking among NASA's top five or six most-requested images. McCandless calls it "an icon for human triumph over gravity or triumph over nature." But the picture is also poignant, in that the boundless optimism it captured has been tempered by tragedies and dead ends. NASA curtailed the shuttle program after the *Challenger* exploded in January 1986, and no shuttle has flown since the *Columbia* disaster two years ago this past February. (At press time, the *Discovery* was scheduled for a launch in mid-July.) And not long after McCandless inspired countless space-travel fans by becoming the first

"human satellite," NASA discontinued the jet pack that had made his extraterrestrial jaunt possible.

McCandless joined NASA's astronaut corps in 1966, and served 24 years. A Navy aviator with a master's degree in electrical engineering, he spent nearly 18 years working Earthbound posts, including ground-to-space radio communications at Mission Control in Houston. And he helped mastermind the jet pack device, known as the manned maneuvering unit, or MMU. "Nobody has left his stamp on any instrument in space like Bruce has left his mark on the backpack," NASA's Charles Whitsett, who headed the MMU design team (and died in 1993) told the *Washington Post*. The device was developed to help astronauts repair or retrieve orbiting satellites.

Not that spacewalking was new. Russian cosmonaut Alexei Leonov took the first walk in space in March 1965, followed three months later by American astronaut Ed White—but both were tied to their spacecraft. The notion of an untethered astronaut hurtling through space at some 17,500 miles per hour stirred excitement and alarm. It would be "the most dangerous space shuttle mission ever," the *Post* reported in 1984. McCandless, now 68, says he took comfort in his insider knowledge of the MMU's safeguards: "I had made up my mind before launch that if I didn't think that it was worth the risk, then I should go somewhere else and get a different job."

McCandless spent a little more than an hour free-flying the first time out—ever the engineer, he would describe it merely as a "thrill"—and went on to log another three untethered hours on the eight-day mission. Crew mate Robert Stewart also took the MMU for a drive, as did four other astronauts on shuttle flights later that year. But NASA dropped the MMU after 1984, in part because astronauts could perform the same tasks with the shuttle's robotic arm. Today, astronauts aboard the International Space Station wear a small, modified version of the device on spacewalks in case of an emergency.

During McCandless' first MMU flight, Gibson, the shuttle pilot, could not stop checking light readings and focus settings, he recalls: "I said, if I don't mess this up, I will get an *Aviation Week* cover with this picture." (He got two.) Now 58, he's a captain for Southwest Airlines and lives in Tennessee with his wife, the former astronaut Rhea Seddon, and the younger two of their four children. He marvels that the McCandless picture, called *Backpacking* by some, "just won't go away."

Since leaving NASA, McCandless has worked as a senior research scientist with Lockheed Martin Space Systems in Littleton, Colorado. He had been developing a machine to repair the ailing Hubble Space Telescope—an instrument he helped launch from a shuttle in 1990 and that is due to peter out around 2008. Does he find it ironic that the human satellite himself has been working on a robot to perform what many argue is an astronaut's job? Not at all. He says that a mix of human and robotic effort is the most effective approach in space. Still, NASA recently jettisoned McCandless' robotic project as overly complex. The agency is weighing a shuttle mission to service Hubble.

McCandless, who lives in Conifer, Colorado, with Bernice, his wife of 45 years, says a goofy version of the famous photograph of him hangs in their home. It shows their grown daughter poking her head through the cut-out visor in a life-size reproduction at a Seattle space museum. The subject's anonymity, he says, is its best feature: "I have the sun visor down, so you can't see my face, and that means it could be anybody in there. It's sort of a representation not of Bruce McCandless, but mankind."

ANNE BROACHE, a former SMITHSONIAN editorial intern, is a reporter for CNET.com.

It would be "the most dangerous space shuttle mission ever."

Dubbed the "human satellite," McCandless (above and left, bottom center, with the 1984 *Challenger* crew, including pilot-photographer Gibson, upper left) now works on space robots.

NASA; MICHAEL LEWIS

They just found out their pain medication could put them at risk for a stomach ulcer.

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While these medications may be effective in providing pain relief, they can weaken the stomach lining, allowing stomach acid to cause an ulcer. Not all stomach ulcers cause symptoms, so talk to your doctor to see if you might be at risk for this problem.

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(esomeprazole magnesium)

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AstraZeneca

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NEXIUM® (esomeprazole magnesium)

20-mg, 40-mg Delayed-Release Capsules

BRIEF SUMMARY Before prescribing NEXIUM, please see full Prescribing Information. **INDICATIONS AND USAGE** NEXIUM is indicated for the short-term treatment (4 to 8 weeks) in the healing and symptomatic resolution of diagnostically confirmed erosive esophagitis; the maintenance of symptom resolution and healing of erosive esophagitis (controlled studies do not extend beyond 6 months); and for the treatment of heartburn and other symptoms associated with GERD; and for risk reduction of NSAID-associated gastric ulcer. **CONTRAINDICATIONS** NEXIUM is contraindicated in patients with known hypersensitivity to any component of the formulation or to substituted benzimidazoles. **PRECAUTIONS** Symptomatic response to therapy with NEXIUM does not preclude the presence of gastric malignancy. Atrophic gastritis has been noted occasionally in gastric corpus biopsies from patients treated long-term with omeprazole, of which NEXIUM is an enantiomer. **Information for Patients** NEXIUM Delayed-Release Capsules should be swallowed whole and taken at least one hour before meals. For patients who have difficulty swallowing capsules, one tablespoon of applesauce can be added to an empty bowl and the NEXIUM Delayed-Release Capsule can be opened, and the pellets carefully emptied onto the applesauce. The pellets should be mixed with the applesauce and then swallowed immediately. The applesauce used should not be hot and should be soft enough to be swallowed without chewing. The pellets should not be chewed or crushed. The pellet/applesauce mixture should not be stored for future use. Antacids may be used while taking NEXIUM. **Drug Interactions** Esomeprazole is extensively metabolized in the liver by CYP2C19 and CYP3A4. *In vitro* and *in vivo* studies have shown that esomeprazole is not likely to inhibit CYPs 1A2, 2A6, 2C9, 2D6, 2E1 and 3A4. No clinically relevant interactions with drugs metabolized by these CYP enzymes would be expected. Drug interaction studies have shown that esomeprazole does not have any clinically significant interactions with phenytoin, warfarin, quinidine, clarithromycin or amoxicillin. Post-marketing reports of changes in prothrombin measures have been received among patients on concomitant warfarin and esomeprazole therapy. Increases in INR and prothrombin time may lead to abnormal bleeding and even death. Patients treated with proton pump inhibitors and warfarin concomitantly may need to be monitored for increases in INR and prothrombin time. Esomeprazole may potentially interfere with CYP2C19, the major esomeprazole metabolizing enzyme. Coadministration of esomeprazole 30 mg and diazepam, a CYP2C19 substrate, resulted in a 45% decrease in clearance of diazepam. Increased plasma levels of diazepam were observed 12 hours after dosing and onwards. However, at that time, the plasma levels of diazepam were below the therapeutic interval, and thus this interaction is unlikely to be of clinical relevance. Coadministration of oral contraceptives, diazepam, phenytoin or quinidine did not seem to change the pharmacokinetic profile of esomeprazole. Studies evaluating concomitant administration of esomeprazole and either naproxen (non-selective NSAID) or rofecoxib (COX-2 selective NSAID) did not identify any clinically relevant changes in the pharmacokinetic profiles of esomeprazole or these NSAIDs. Esomeprazole inhibits gastric acid secretion. Therefore, esomeprazole may interfere with the absorption of drugs where gastric pH is an important determinant of bioavailability (eg, ketoconazole, iron salts and digoxin). **Carcinogenesis, Mutagenesis, Impairment of Fertility** The carcinogenic potential of esomeprazole was assessed using omeprazole studies. In two 24-month oral carcinogenicity studies in rats, omeprazole at daily doses of 1.7, 3.4, 13.8, 44.0 and 140.8 mg/kg/day (about 0.7 to 57 times the human dose of 20 mg/day expressed on a body surface area basis) produced gastric ECL cell carcinoids in a dose-related manner in both male and female rats; the incidence of this effect was markedly higher in female rats, which had higher blood levels of omeprazole. Gastric carcinoids seldom occur in the untreated rat. In addition, ECL cell hyperplasia was present in all treated groups of both sexes. In one of these studies, female rats were treated with 13.8 mg omeprazole/kg/day (about 5.6 times the human dose on a body surface area basis) for 1 year, then followed for an additional year without the drug. No carcinoids were seen in these rats. An increased incidence of treatment-related ECL cell hyperplasia was observed at the end of 1 year (94% treated vs 10% controls). By the second year the difference between treated and control rats was much smaller (46% vs 26%) but still showed more hyperplasia in the treated group. Gastric adenocarcinoma was seen in one rat (2%). No similar tumor was seen in male or female rats treated for 2 years. For this strain of rat, no similar tumor has been noted historically, but a finding involving only one tumor is difficult to interpret. A 78-week mouse carcinogenicity study of omeprazole did not show increased tumor occurrence, but the study was not conclusive. Esomeprazole was negative in the Ames mutation test, in the *in vivo* rat bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. Esomeprazole, however, was positive in the *in vitro* human lymphocyte chromosome aberration test, but negative in the *in vitro* human lymphocyte chromosome aberration test. Omeprazole was positive in the *in vitro* human lymphocyte chromosome aberration test, the *in vivo* mouse bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. The potential effects of esomeprazole on fertility and reproductive performance were assessed using omeprazole studies. Omeprazole at oral doses up to 138 mg/kg/day in rats (about 56 times the human dose on a body surface area basis) was found to have no effect on reproductive performance of parental animals. **Pregnancy** *Teratogenic Effects. Pregnancy Category B* Teratology studies have been performed in rats at oral doses up to 280 mg/kg/day (about 57 times the human dose on a body surface area basis) and in rabbits at oral doses up to 86 mg/kg/day (about 35 times the human dose on a body surface area basis) and have revealed no evidence of impaired fertility or harm to the fetus due to esomeprazole. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed. Teratology studies conducted with omeprazole in rats at oral doses up to 138 mg/kg/day (about 56 times the human dose on a body surface area basis) and in rabbits at doses up to 69 mg/kg/day (about 56 times the human dose on a body surface area basis) did not disclose any evidence for a teratogenic potential of omeprazole. In rabbits, omeprazole in a dose range of 6.9 to 69.1 mg/kg/day (about 5.5 to 56 times the human dose on a body surface area basis) produced dose-related increases in embryo-lethality, fetal resorptions, and pregnancy disruptions. In rats, dose-related embryo/fetal toxicity and postnatal developmental toxicity were observed in offspring resulting from parents treated with omeprazole at 13.8 to 138.9 mg/kg/day (about 5.6 to 56 times the human doses on a body surface area basis). There are no adequate and well-controlled studies in pregnant women. Sporadic reports have been received of congenital abnormalities occurring in infants born to women who have received omeprazole during pregnancy. **Nursing Mothers** The excretion of esomeprazole in milk has not been studied. However, omeprazole concentrations have been measured in breast milk of a woman following oral administration of 20 mg. Because esomeprazole is likely to be excreted in human milk, because of the potential for serious adverse reactions in nursing infants from esomeprazole, and because of the potential for tumorigenicity shown for omeprazole in rat carcinogenicity studies, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother. **Pediatric Use** Safety and effectiveness in pediatric patients have not been established. **Geriatric Use** Of the total number of patients who received NEXIUM in clinical trials, 1459 were 65 to 74 years of age and 354 patients were 75 years of age. **ADVERSE REACTIONS** The safety of NEXIUM was evaluated in over 15,000 patients (aged 18-84 years) in clinical trials worldwide including over 8,500 patients in the United States and over 6,500 patients in Europe and Canada. Over 2,900 patients were treated in long-term studies for up to 6-12 months. In general, NEXIUM was well tolerated in both short- and long-term clinical trials. The safety in the treatment of healing of erosive esophagitis was assessed in four randomized comparative clinical trials, which included 1,240 patients on NEXIUM 20 mg, 2,434 patients on NEXIUM 40 mg, and 3,008 patients on omeprazole 20 mg daily. The most frequently occurring adverse events (1%) in all three groups was headache (5.5, 5.0, and 3.8, respectively) and diarrhea (no difference among the three groups). Nausea, flatulence, abdominal pain, constipation, and dry mouth occurred at similar rates among patients taking NEXIUM or omeprazole. Additional adverse events that were reported as possibly or probably related to NEXIUM with an incidence < 1% are listed below by body system: ***Body as a Whole:*** abdomen enlarged, allergic reaction, asthenia, back pain, chest pain, chest pain substernal, facial edema, peripheral edema, hot flushes, fatigue, fever, flu-like disorder, generalized edema, leg edema, malaise, pain, rigors; ***Cardiovascular:*** flushing, hypertension, tachycardia; ***Endocrine:*** goiter; ***Gastrointestinal:*** bowel irregularity, constipation aggravated, dyspepsia, dysphagia, dysplasia GI, epigastric pain, eructation, esophageal disorder, frequent stools, gastroenteritis, GI hemorrhage, GI symptoms not otherwise specified, hiccup, melena, mouth disorder, pharynx disorder, rectal disorder, serum gastrin increased, tongue disorder, tongue edema, ulcerative stomatitis, vomiting; ***Hearing:*** earache, tinnitus; ***Hematologic:*** anemia, anemia hypochromic, cervical lymphadenopathy, epistaxis, leukocytosis, leukopenia, thrombocytopenia; ***Hepatic:*** bilirubinemia, hepatic function abnormal, SGOT increased, SGPT increased; ***Metabolic/Nutritional:*** glycosuria, hyperuricemia, hyponatremia, increased alkaline phosphatase, thirst, vitamin B12 deficiency, weight increase, weight decrease; ***Musculoskeletal:*** arthralgia, arthritis aggravated, arthropathy, cramps, fibromyalgia syndrome, hernia, polymyalgia rheumatica; ***Nervous System/Psychiatric:*** anorexia, apathy, appetite increased, confusion, depression aggravated, dizziness, hypertonia, nervousness, hypoesthesia, impotence, insomnia, migraine, migraine aggravated, paresthesia, sleep disorder, somnolence, tremor, vertigo, visual field defect; ***Reproductive:*** dysmenorrhea, menstrual disorder, vaginitis; ***Respiratory:*** asthma aggravated, coughing, dyspnea, larynx edema, pharyngitis, rhinitis, sinusitis; ***Skin and Appendages:*** acne, angioedema, dermatitis, pruritus, pruritus ani, rash, rash erythematous, rash maculopapular, skin inflammation, sweating increased, urticaria; ***Special Senses:*** otitis media, parosmia, taste loss, taste perversion; ***Urogenital:*** abnormal urine, albuminuria, cystitis, dysuria, fungal infection, hematuria, micturition frequency, monilasis, genital monilasis, polyuria; ***Visual:*** conjunctivitis, vision abnormal. Endoscopic findings that were reported as adverse events include: duodenitis, esophagitis, esophageal stricture, esophageal ulceration, esophageal varices, gastric ulcer, gastritis, hernia, benign polyps or nodules, Barrett's esophagus, and mucosal discoloration. Two placebo-controlled studies were conducted in 710 patients for the treatment of symptomatic gastroesophageal reflux disease. The most common adverse events that were reported as possibly or probably related to NEXIUM were diarrhea (4.3%), headache (3.8%), and abdominal pain (3.8%). Postmarketing Reports – There have been spontaneous reports of adverse events with postmarketing use of esomeprazole. These reports have included rare cases of anaphylactic reaction and myalgia, severe dermatologic reactions, including toxic epidermal necrolysis (TEN, some fatal), Stevens-Johnson syndrome, and erythema multiforme, and pancreatitis. Very rarely, hepatitis with or without jaundice has been reported. Other adverse events not observed with NEXIUM, but occurring with omeprazole can be found in the omeprazole package insert **ADVERSE REACTIONS** section. **OVERDOSAGE** A single oral dose of esomeprazole at 510 mg/kg (about 103 times the human dose on a body surface area basis), was lethal to rats. The major signs of acute toxicity were reduced motor activity, changes in respiratory frequency, tremor, ataxia, and intermittent clonic convulsions. There have been some reports of overdosage with esomeprazole. Reports have been received of overdosage with omeprazole in humans. Doses ranged up to 2,400 mg (120 times the usual recommended clinical dose). Manifestations were variable, but included confusion, drowsiness, blurred vision, tachycardia, nausea, diaphoresis, flushing, headache, dry mouth, and other adverse reactions similar to those seen in normal clinical experience (see omeprazole package insert-**ADVERSE REACTIONS**). No specific antidote for esomeprazole is known. Since esomeprazole is extensively protein bound, it is not expected to be removed by dialysis. In the event of overdosage, treatment should be symptomatic and supportive. As with the management of any overdose, the possibility of multiple drug ingestion should be considered. For current information on treatment of any drug overdose, a certified Regional Poison Control Center should be contacted. Telephone numbers are listed in the Physicians' Desk Reference (PDR) or local telephone book. **DOSAGE AND ADMINISTRATION** Please see full Prescribing Information for recommended adult dosages and dosage adjustments for **Special Populations** for NEXIUM.

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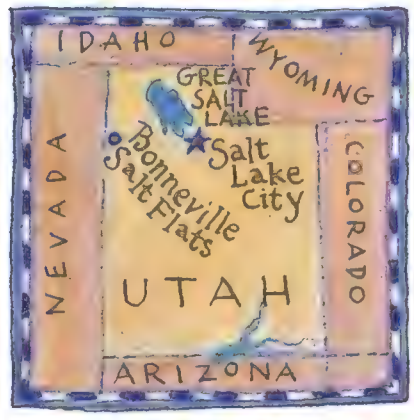
"There is no place like this in the world," says racer Bob Stahl about Bonneville, whose vast salt flats attract drivers from many nations.

PETER VINCENT; ELIZABETH WOLF

IN THE FAST LANE

DRIVERS GEAR UP TO SET SPEED RECORDS AT UTAH'S DESOLATE BONNEVILLE SALT FLATS **BY PRESTON LERNER**

FOR A WEEK EVERY AUGUST, the Bonneville Salt Flats, 120 miles west of Salt Lake City, is the site of a summer ritual in which Yankee ingenuity meets the human fascination with fast cars. Hundreds of drivers congregate in sweltering desert heat to race candy-colored, homebuilt hot rods on hard-packed salt, a dazzling white straightaway as smooth as Formica. Although Bonneville is the world's largest racecourse and the place where most of the fastest land-speed records have been set, Speed Week is not to be confused with the Indy 500 or the Monaco Grand Prix, where drivers compete against one another. Here, drivers race against the clock.



Steve Burke, 57, has been coming to Bonneville since 1952, first as a spectator, then as a racer. He once flipped a car at 225 miles per hour and barrel-rolled another at 307 mph. Today, the San Gabriel, California, organizational consultant is queued up with dozens of other middle-aged hot rodders waiting to hit the salt. His car has been lowered and lengthened so radically—to improve its aerodynamics—that not even an aficionado would recognize it as a Mazda RX-7 coupe. "Anything you can create," Burke says, "anything you can invent—this

"There's nothing here when we arrive and scars disappear with the first rainstorm."

Actor Anthony Hopkins (at Bonneville in 2004) portrays record-setting racer Burt Munro in an upcoming film. Hopkins has called the sun at the salt flats "blistering."

is the place to see how fast it can go."

Farther up the starting line, wearing a bulky firesuit, Bob Drury lounges next to a yellow 1953 Studebaker that he's modified with a high-tech chassis he built from scratch. His top speed in the rig is 220 mph. Drury, 58, a retired sheet-metal worker from Vancouver, Washington, first visited Bonneville 11 years ago. "After 20 minutes," he says, "I knew I was going to build something myself. This is the last place on earth where Rube Goldberg can compete."

As complex as the cars may be, the racing couldn't be simpler. Two 90-foot-wide courses marked with black lines stretch as far as five miles but seem to go on to infinity. Drivers and cars get ready to rumble in makeshift service pits. At the starting line, a driver is waved onto the course every few minutes. Unless he—most of the racers are men—has a problem, he'll keep the throttle buried for his entire run while his speed is clocked electronically.

There's no money at stake, and precious little glory. The prospect of going just one mile per hour faster than last year keeps true believers coming back. New Zealand motorcycle racer Burt Munro repeatedly returned to Bonneville to race a 1920 Indian Scout bike he had radically modified over half a century, setting speed records in the 1960s and inspiring an upcoming movie, *The World's Fastest Indian,* starring Anthony Hopkins.

For some, the vast and barren landscape contributes to the salt fever. "The salt is pure, pristine, white—almost surrealistically gorgeous at sunrise and sunset," says Ron Jolliffe, a retired college art history professor from Hailey, Idaho, whose '34 Ford roadster was clocked at 240 mph last summer. "There's nothing here when we arrive, and the few scars that we leave behind disappear with the first rainstorm. It's an environmental masterpiece."

The 30,000 acres of salt flats are the residue of ancient Lake Bonneville, which began drying up about 15,000 years ago. Every winter, a shallow aquifer floods the flats, which dry again under spring and summer's unrelenting sun.

Historically, human beings have prudently given the place a wide berth. But the desolate terrain that renders the salt flats so inhospitable to flora and fauna makes them perfect for land-speed record-breaking. In 1896, in a publicity stunt dreamed up by newspaper mogul William Randolph Hearst, William D. Rishel became the first racer to cross the flats—on a bicycle. The first automobile speed record was set in 1914: 141.73 mph. Meanwhile, California gearheads began converting Model A and Model T Fords into the first hot rods, which they raced on the dry lakes of the Mojave Desert. In 1937 the Southern California Timing Association (SCTA) was created to formalize the competition.

Craving a bigger and safer course, SCTA members started Bonneville Speed Week in 1949. Bill Burke, Steve's father, showed up with a contraption that epitomized the freewheeling spirit of the time—a stogie-shaped speedster fashioned from the belly fuel tank of a P-38 fighter plane. "When I was in the service, we stopped on an island, and there was a cargo ship full of them," he recalls. "I went aboard and said, 'Oh, my God! What a great race car this would make!'" Burke bought one for $35, fitted it with two axles, shoehorned a flathead Ford V-8 behind a crude cockpit and proceeded to go 158 mph. Belly tanks remain a staple of Speed Week.

The highest speed on the salt, 622.407 mph, was set by Gary Gabelich in 1970 in a vehicle powered by a rocket engine. The current world land-speed record of 763 mph was set in 1997 at Black Rock Desert in Nevada, in a jet-propelled car, but Bonneville is still the choice of most racers.

And most Bonneville drivers race old-fashioned Detroit iron. At times, you can look around and swear it's 1958. But there's always something innovative on the salt. Last summer, a team of Ohio State University students pushed an electric car (just 2 feet wide and less than 3 feet tall) beyond 300 mph, and a hybrid-electric Toyota Prius sedan maxed out at 130.7 mph.

Bob Stahl of Huntington Beach, California, races a 1965 VW Beetle that was once his daughter's daily transportation. "Originally, I just wanted to go play a little," he says. "Then I got serious. The salt bug'll bite you."

PRESTON LERNER, an amateur racer, lives in Los Angeles and writes about cars.

CHUCK ZLOTNICK

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CRYSTAL CRUISES

A BITTERSWEET HOMECOMING

AS THE CORPS FINALLY MAKES CONTACT WITH THE SHOSHONE INDIANS, INTERPRETER SACAGAWEA REUNITES WITH HER FAMILY

Clark: "The Great Chief of this nation proved to be the brother of the *Woman* with us and is a man of Influence [and] Cincerity."

AFTER *Meriwether Lewis and William Clark, the Indian interpreter and guide Sacagawea is probably the most famous member of the expedition. Her contributions were praised by the captains; William Clark wrote to Sacagawea's husband, Toussaint Charbonneau, in 1806: "[Y]our woman who accompanied you that long dangerous and fatigueing rout to the Pacific Ocian and back diserved a greater reward for her attention and services on that rout than we had in our power to give her. . . ." As August began, 200 years ago, the corps was still searching for Sacagawea's tribe, the Shoshone, or Snake, Indians, and the horses the expedition members so desperately needed.*

August 1, 1805 [Sgt. Patrick Gass]
We set out early in a fine morning and proceeded on till breakfast time; when Capt. Lewis, myself and the two interpreters went on ahead to look for some of the Snake Indians.

August 8 [Capt. Meriwether Lewis]
The Indian woman recognized the point of a high plain to our right which she informed us was not very distant from the summer retreat of her nation on a river beyond the mountains which runs to the west. . . . she assures us that we shall either find her people on this river or on the river immediately west of it's source. . . . as it is now all important with us to meet with those people as soon as possible, I determined to proceed tomorrow with a small party to the source of the principal stream of this river and pass the mountains to the Columbia; and down that river untill I found the Indians; in short it is my resolusion to find them or some others, who have horses if it should cause me a trip of one month. for without horses we shall be obliged to leave a great part of our stores, of which, it appears to me that we have a stock already sufficiently small for the length of the voyage before us.

August 11 [Lewis]
After having marched . . . for about five miles I discovered an Indian on horse back about two miles distant coming down the plain toward us. . . . I got nearer than about 100 paces when he suddonly turned his [horse] about, gave him the whip leaped the creek and disapeared in the willow brush in an instant and with him vanished all my hopes of obtaining horses for the preasent.

ERIC VON SCHMIDT

August 13 [Lewis]
We set out very early. . . . when we were so fortunate as to meet with three female savages. . . . I informed them by signs that I wished them to conduct us to their camp that we wer anxious to become acquainted with the chiefs and warriors of their nation.

August 14 [Lewis]
I concluded to spend this day at the Shoshone Camp and obtain what information I could with rispect to the country. . . . The means I had of communicating with these people was by way of Drewyer who understood perfectly the common language of jesticulation or signs which seems to be universally understood by all the Nations we have yet seen. . . . [I told the people that] we would then remain sometime among them and trade with them for horses, and finally concert our future plans for geting on to the ocean.

August 17 [Lewis; Biddle edition]
On setting out at seven o'clock, captain Clarke with Chaboneau and his wife [Sacagawea] walked on shore, but they had not gone more than a mile before captain Clarke saw Sacajawea, who was with her husband one hundred yards ahead, began to dance, and show every mark of the most extravagant joy, turning round him and pointing to several Indians, whom he now saw advancing on horseback, sucking her fingers at the same time to indicate that they were of her native tribe. . . . We soon drew near to the camp, and just as we approached it a woman made her way through the croud towards Sacajawea, and recognising each other, they embraced with the most tender affection. The meeting of these two young women had in it something peculiarly touching, not only in the ardent manner in which their feelings were expressed, but from the real interest of their situation. They had been companions in childhood, in the war with the Minnetarees they had both been taken prisoners in the same battle, they had shared and softened the rigours of their captivity, till one of them had escaped from the Minnetarees, with scarce a hope of ever seeing her friend relieved from the hands of her enemies. . . . [When trade negotiations were ready] Sacajawea was sent for; she came into the tent, sat down, and was beginning to interpret, when in the person of [Chief] Cameahwait she recognized her brother: she instantly jumped up, and ran and embraced him, throwing over him her blanket and weeping profusely: the chief was himself moved, though not in the same degree. After some conversation between them she resumed her seat, and attempted to interpret for us, but her new situation seemed to overpower her, and she was frequently interrupted by her tears. After the council was finished, the unfortunate woman learnt that all her family were dead except two brothers, one of whom was absent, and a son of her eldest sister, a small boy, who was immediately adopted by her.

Seven years after her reunion with the Shoshone, Sacagawea and her husband turned up at Fort Manuel, a trading post near present-day Bismark, North Dakota, where Toussaint had found work as an interpreter with the Missouri Fur Company. Journalist Henry Brackenridge wrote that Sacagawea was ill "and longed to revisit her native country." She never got the chance. On December 20, 1812, John Luttig, the fort's chief clerk, wrote in his logbook that Sacagawea "died of a putrid fever she was a good and the best Women in the fort." She would have been about 25. She left behind two biological children: 7-year-old Jean Baptiste and 4-month-old Lisette.

The following year Luttig, possibly representing William Clark (for whom he had worked), petitioned the Orphans' Court in St. Louis for guardianship of Jean Baptiste and Lisette. (By then, Toussaint was presumed dead, having not been seen for six months.) Luttig's name was eventually crossed out on the petition and replaced with that of Clark, who, at the very least, paid for Baptiste's education. (Baptiste later traveled to Europe, where he remained for six years. Upon returning to the United States, he worked as a trapper with Jim Bridger and Kit Carson.) Lisette's fate, and that of Sacagawea's nephew, is unknown.

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BAKED ALASKA

A UNIQUE STUDY DOCUMENTS THE DISAPPEARANCE OF ALASKA'S GLACIERS, BLAMED ON GLOBAL WARMING **BY LAURA HELMUTH**

In the late 1800s, Alaska's top tourist attraction was Muir Glacier. Ladies in ankle-length dresses and gentlemen in neckties and fedora hats strolled a boardwalk at the foot of this natural wonder. Glaciers are still a big draw in Alaska; every year, more than 350,000 people visit Muir Glacier's home, Glacier Bay National Park. But the scenery there has changed as dramatically as clothing fashions.

As mighty as glaciers look from the deck of a cruise ship, they are surprisingly fragile. A unique collection of photographs of Alaskan glaciers taken over the past century shows that as temperatures have risen there by about 5 degrees Fahrenheit, almost all of the glaciers have retreated into the hills. Bruce Molnia, a geologist with the U.S. Geological Survey (USGS) in Reston, Virginia, started collecting old photographs of Alaskan glaciers in the 1970s. He's up to a few thousand so far, gathered from the USGS library in Denver, the National Snow and Ice Data Center at the University of Colorado in Boulder, the Alaska State Library and other archives, as well as picture postcards that people sent him or that he bought on eBay. The oldest pictures were taken in 1883 by a U.S. military expedition to the Yukon River. Molnia has updated 200 of the pictures, traveling to the very spots where each was taken and photographing the

In just 91 years—a geologic blink of an eye—Toboggan Glacier in Prince William Sound (in 1909, top, and a follow-up at the same spot and time of year) melted up the mountain.

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"Sometimes, when I'm stumbling around, trying to find the right spot, I'll see a cairn built in 1909," says Molnia.

Thousands of 19th-century tourists (departing for Muir Glacier in 1895) were drawn to what is now Glacier Bay National Park by the writings of naturalist John Muir. He first glimpsed these glaciers in 1879, when Tlingit Indians canoed him into the bay.

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same scene at the same time of year. His pictures may be less precise than satellite analyses, GPS studies and other high-tech methods with which scientists track glaciers. But his before-and-after photographs offer perhaps the most vivid evidence that Alaska's glaciers are indeed melting.

Often Molnia knew exactly where to pull out his camera. Some of the geologists who went before him kept careful records, and a few even built rock piles, or cairns, to mark for posterity where they took their photographs. "Sometimes, when I'm stumbling around in the brush trying to find the right spot, I'll see a cairn built in 1909," says Molnia. Some of the cairns are covered in shrubs and trees. New plant growth on slopes that were once bare bedrock is another sign that Alaska has warmed up in the past century. "Even if the older photos were in color, they would still be mostly black and white," Molnia says; the new photographs show a lot of green. Geologists studying other historic images have found that lichens and mosses that thrive in high latitudes, and feed caribou, are losing ground to warmer-weather species.

Molnia's double takes chronicle glaciers in Glacier Bay, Denali and Kenai Fjords National Parks and in the Chugach National Forest. Those places

Bruce Molnia has revisited more than 200 previously photographed views.

may seem plenty cold to a Lower-48'er, but the temperature does rise above freezing for several months each year, and the 5 degree increase in average annual temperature over the past 75 to 100 years has taken its toll. Of the glaciers that Molnia has studied, only 1 to 2 percent have grown, probably due to increased snowfall at higher elevations. The rest are visibly shrinking, one by 20 miles in 95 years. Such melting of glaciers and sea ice threatens 86 percent of Alaska's villages with flooding and erosion, according to a 2003 study by the Government Accountability Office.

Glaciers are dwindling almost everywhere. In the Arctic National Wildlife Refuge, all the glaciers are shrinking. In Antarctica, and atop mountains in China, Peru and Argentina, glaciers are melting fast, as is the icy cap of Mount Kilimanjaro. If the current trend continues, says

Someone should bring environmentally conscious technologies to environmentally sensitive locations. Which is why the National Park Service is celebrating the delivery of 18 shuttle buses to Yosemite National Park that are powered by GM's advanced hybrid technology. These buses will operate year-round, carry up to 1,050 passengers per hour and help reduce the number of passenger vehicles on the road inside the park. And since they utilize hybrid electric technology, these buses will dramatically reduce both engine noise and emissions in one of our nation's most treasured scenic destinations. That's how we approach the environment at GM. Real-world solutions that really make a difference.

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Because of greenhouse gases, "the change in the next 150 years will dwarf the change in the past 150 years," says David Battisti.

Glaciers reflect sunlight, and when they shrink (Muir Glacier, above, vanished from this view in 28 years) more solar energy reaches earth, worsening warming trends.

glaciologist Lonnie Thompson of Ohio State University, in 30 years Glacier National Park on the Montana-Canada border will have no glaciers.

Some glaciers started melting hundreds of years ago. The demise of Muir Glacier may have been hastened by a shattering earthquake in 1899. Natural variations in the earth's climate, caused by volcanoes or wiggles in the earth's orbit and orientation around the sun, which alter the amount of sunlight hitting the continents, have caused ice ages to come and go. But lately, especially in the past 50 years, almost all experts agree, a spike in carbon dioxide levels in the atmosphere has exaggerated the greenhouse effect, in which a buildup of certain gases traps heat. What's more, because carbon dioxide lingers in the atmosphere, and because people are burning more carbon-dioxide-releasing fuel all the time, "the change in the next 150 years will dwarf the change in the past 150 years," says David Battisti of the University of Washington. Computer simulations of future climate changes, which have been validated by testing them against historic climate changes, make the same prediction. "It's going to be a very different world, a much warmer world," says Michael Oppenheimer of Princeton University.

Glaciers are fed by snow; the weight of new snowfall squeezes old flakes into ice crystals that can grow as large as your head. When light pierces the compacted ice, red wavelengths are absorbed, leaving a ghostly blue glow. Forget about sapphires, cornflowers or even the sky—nature's finest blue is glacier blue. Only once-deep glacier ice emits the cold color. You can see this bluest blue best at the bottom of a crevasse, or where glaciers are calving, or—more achingly beautiful still—where they are melting.

LAURA HELMUTH is the senior editor for science at SMITHSONIAN.

BRUCE F. MOLNIA / GEOLOGICAL SURVEY (2)

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READY FOR HIS CLOSE-UP Cheetah cub Chaka and his mother, Zazi, primp before the youngster's June 25 "reveal" at Washington, D.C.'s National Zoo. Shielded from the public eye until 10 weeks of age, Chaka and his four siblings now relish the spotlight, says Craig Saffoe, the Zoo's primary cheetah keeper. "They were born to be stars, to be great ambassadors for their species." Born in April, the cubs are the Zoo's second cheetah litter in seven months (and in its 116-year history). The fastest land mammals alive, adult cheetahs can run 60 miles per hour, but the fewer than 15,000 wild cheetahs struggle to outrun extinction. Photograph by Jonathan Ernst/Reuters. —*HELEN STARKWEATHER*

HITTING THE CRAB POT JACKPOT

FISHERMEN HAVE CASHED IN HELPING SCIENTISTS STUDY THE RAPID, WORRISOME DECLINE OF BLUE CRABS IN THE CHESAPEAKE BAY

RALPH YATES was plying the waters of the Chesapeake Bay last summer in his boat, *Critter Gitter,* when he pulled up a crab pot and found that he'd caught a winning lottery ticket. The trap held a female blue crab bearing a pink plastic tag that promised a reward and listed a phone number. Yates, a 51-year-old commercial fisherman, or "waterman" in Chesapeake parlance, dialed and got biologist Rob Aguilar of the Smithsonian Environmental Research Center (SERC) in Edgewater, Maryland. Aguilar noted where the crab was caught and mailed Yates a $5 bill. Then, in December, Yates won a $200 jackpot after SERC scientists selected his name from among the 80 watermen, recreational crabbers, crab packers and even a restaurant patron or two who in previous years ended up with a tagged crab.

Powerball earnings these are not; Yates says he used the money to pay off some bills. But the lab's lottery is part of a six-year study of Chesapeake Bay blue crabs aimed at countering the crustacean's rapid decline, which has been tied mainly to overfishing, pesticide and fertilizer runoff from farms and residential lawns, and habitat destruction. Over the past decade, the number of female blue crabs in the Chesapeake has plummeted more than 80 percent, jeopardizing the bay's $50 million blue crab fishery, which is one-third of the U.S. market.

That crabs travel, sometimes great distances, is well-known to both fishermen and biologists. After mating in and around rivers in the upper Chesa-

Waterman Ralph Yates says he paid bills with his $200 SERC lottery earnings.

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Opera house image courtesy of the Hungarian State Opera, Budapest, Hungary.
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peake, female blue crabs somehow manage to swim, crawl or clamber more than 100 miles to the mouth of the bay. There, they spawn 750,000 to 8,000,000 eggs apiece, with less than 1 percent of the offspring surviving. (Male blue crabs are less peripatetic.) Females mate only once in their lifetime (at about 3 years of age), so a lot rides on their making the journey.

Until recently, little has been known about the route and timing of the female crabs' extraordinary, unseen migration. To better understand them and the crab's complex life cycle, SERC researchers have since 1999 been buying bushels of live crabs and then tagging and releasing them in the upper bay. All told, they've released 3,500 tagged crabs, and some 600 have been captured and reported. A study by Aguilar and senior scientist Anson Hines, recently published in the *Journal of Experimental Marine Biology and Ecology*, shows for the first time the route that many pregnant females follow—along the eastern shoulder of the bay's deep center channel. Moreover,

One of SERC's pink-tagged crabs was recaptured 646 miles away in Florida.

though some crabs begin the journey in July and August, peak migration occurs in September and October, with many reaching the mouth of the bay in November. "With this data," says Hines, "we can work with watermen and fisheries managers to reduce fishing pressure at places and times when the female crabs are most vulnerable." And, as Hines points out, strategies to help the blue crab, which is what ecologists call a "keystone" species, or a critical organism in the ecosystem, benefit other species as well.

This summer, the researchers plan to release 3,000 more tagged crabs in a river in the upper bay to assess population trends, with the goal of someday possibly restocking the bay with blue crabs. In addition to the $5 bounties for reported crabs, the scientists are also throwing in a few crabs with tags offering rewards of $100 to ensure an even greater response from crabbers.

Watermen and biologists have not always seen eye to eye, given the scientists' need to regulate the fishery and the fishermen's need to work it. But as crab stocks dwindle, the two groups' interests have increasingly aligned. Yates, a 14-year veteran who fishes 250 to 600 crab pots, says he was delighted to help out, and not just because he won the lottery. "Making a living as a waterman has always been hard," he says, "but it's been getting even more difficult lately." —*JOHN F. ROSS*

ALICIA YOUNG-WILLIAMS / SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER; CORBIS

FROM THE ATTIC

SPEAK SOFTLY, CARRY A BIG RIFLE In the spring of 1909, a feisty 50-year-old Teddy Roosevelt, having just finished his second term as the 26th president of the United States, went to work for the Smithsonian Institution. He headed up the yearlong Smithsonian-Roosevelt African Expedition to collect specimens for the newly built National Museum of Natural History. Roosevelt, a pioneering conservationist who as president had set aside some 230 million U.S. acres for preservation, traveled with his son Kermit, three naturalists and 200 porters. The expedition bagged 11,397 birds, reptiles, fish and mammals, including 18 rhinoceroses. He shot the black rhino above that summer in the Sotik region of today's Kenya. The bull had "wheeled and faced round, evidently with the intention of charging," Roosevelt later wrote. Most of the Roosevelt specimens remain in the Institution's research collections, but a white rhino he shot in present-day Uganda is still on view in the museum's Mammal Hall. —*BETH PY-LIEBERMAN*

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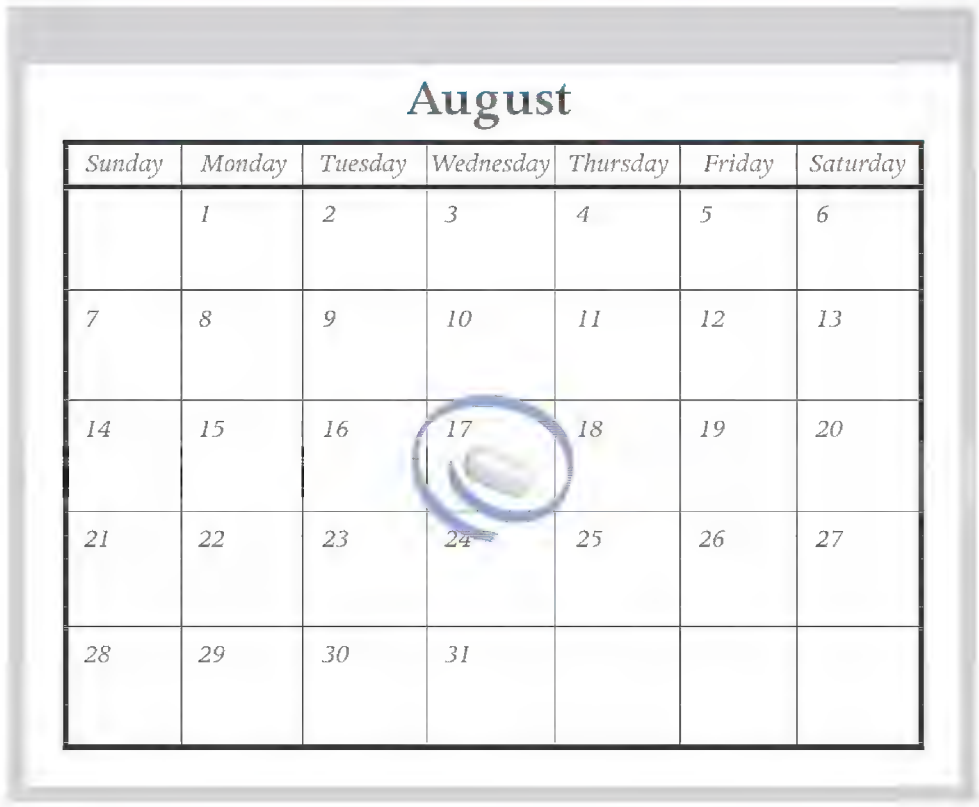
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For healthy bones, ask your doctor about once-monthly Boniva today.

Important Safety Information: You should not take prescription BONIVA if you have low blood calcium, cannot sit or stand for at least 60 minutes, have severe kidney disease, or are allergic to BONIVA. Stop taking BONIVA and tell your doctor if you experience difficult or painful swallowing, chest pain, or severe or continuing heartburn, as these may be signs of serious upper digestive problems. Follow the once-monthly BONIVA 150 mg dosing instructions carefully to lower the chance of these events occurring. Side effects are generally mild or moderate and may include diarrhea, pain in the arms or legs, or upset stomach. If you develop severe bone, joint, and/or muscle pain, contact your healthcare provider. Your doctor may also recommend a calcium and vitamin D supplement.

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Patient Information

BONIVA® [bon-EE-va] (ibandronate sodium) TABLETS

Rx only

Read this patient information carefully before you start taking BONIVA. Read this patient information each time you get a refill for BONIVA. There may be new information. This information is not everything you need to know about BONIVA. It does not take the place of talking with your health care provider about your condition or your treatment. Talk about BONIVA with your health care provider before you start taking it, and at your regular check-ups.

What is the most important information I should know about BONIVA?

BONIVA may cause serious problems in the stomach and the esophagus (the tube that connects your mouth and stomach) such as trouble swallowing, heartburn, and ulcers (see **"What are the possible side effects of BONIVA?"**).

You must take BONIVA exactly as prescribed for BONIVA to work for you and to lower the chance of serious side effects (see **"How should I take BONIVA?"**).

What is BONIVA?

BONIVA is a prescription medicine used to treat or prevent osteoporosis in women after menopause (see **"What is osteoporosis?"**).

BONIVA may reverse bone loss by stopping more loss of bone and increasing bone mass in most women who take it, even though they won't be able to see or feel a difference. BONIVA may help lower the chances of breaking bones (fractures).

For BONIVA to treat or prevent osteoporosis, you have to take it as prescribed. BONIVA will not work if you stop taking it.

Who should not take BONIVA?

Do not take BONIVA if you:

- have low blood calcium (hypocalcemia)
- cannot sit or stand up for at least 1 hour (60 minutes)
- have kidneys that work very poorly
- are allergic to ibandronate sodium or any of the other ingredients of BONIVA (see the end of this page for a list of all the ingredients in BONIVA)

Tell your health care provider before using BONIVA:

- if you are pregnant or planning to become pregnant. It is not known if BONIVA can harm your unborn baby.
- if you are breast-feeding. It is not known if BONIVA passes into your milk and if it can harm your baby.
- have swallowing problems or other problems with your esophagus (the tube that connects your mouth and stomach)
- if you have kidney problems
- **about all the medicines you take** including prescription and non-prescription medicines, vitamins and supplements. Some medicines, especially certain vitamins, supplements, and antacids can stop BONIVA from getting to your bones. This can happen if you take other medicines too close to the time that you take BONIVA (see **"How should I take BONIVA?"**).

How should I take BONIVA?

- Take BONIVA exactly as instructed by your health care provider.
- Take BONIVA first thing in the morning at least 1 hour (60 minutes) before you eat, drink anything other than plain water, or take any other oral medicine.
- Take BONIVA with 6 to 8 ounces (about 1 full cup) of plain water. Do not take it with any other drink besides plain water. Do not take it with other drinks, such as mineral water, sparkling water, coffee, tea, dairy drinks (such as milk), or juice.
- Swallow BONIVA whole. Do not chew or suck the tablet or keep it in your mouth to melt or dissolve.
- After taking BONIVA you must wait at least 1 hour (60 minutes) before:
  - -Lying down. You may sit, stand, or do normal activities like read the newspaper or take a walk.
  - -Eating or drinking anything except for plain water.
  - -Taking other oral medicines including vitamins, calcium, or antacids. Take your vitamins, calcium, and antacids at a different time of the day from the time when you take BONIVA.
- If you take too much BONIVA, drink a full glass of milk and call your local poison control center or emergency room right away. Do not make yourself vomit. Do not lie down.
- Keep taking BONIVA for as long as your health care provider tells you. BONIVA will not work if you stop taking it.
- Your health care provider may tell you to exercise and take calcium and vitamin supplements to help your osteoporosis.
- Your health care provider may do a test to measure the thickness (density) of your bones or do other tests to check your progress.

What is my BONIVA schedule?

Schedule for taking BONIVA 150 mg once monthly:

- Take one BONIVA 150-mg tablet once a month.
- Choose one date of the month (your BONIVA day) that you will remember and that best fits your schedule to take your BONIVA 150-mg tablet.
- Take one BONIVA 150-mg tablet in the morning of your chosen day (see **"How should I take BONIVA?"**).

What to do if I miss a monthly dose:

- If your next scheduled BONIVA day is more than 7 days away, take one BONIVA 150-mg tablet in the morning following the day that you remember (see **"How should I take BONIVA?"**). Then return to taking one BONIVA 150-mg tablet every month in the morning of your chosen day, according to your original schedule.
- **Do not** take two 150-mg tablets within the same week. If your next scheduled BONIVA day is only 1 to 7 days away, **wait** until your next scheduled BONIVA day to take your tablet. Then return to taking one BONIVA 150-mg tablet every month in the morning of your chosen day, according to your original schedule.
- **If you are not sure what to do if you miss a dose, contact your health care provider who will be able to advise you.**

Schedule for taking BONIVA 2.5 mg once daily:

- Take one BONIVA 2.5-mg tablet once a day first thing in the morning at least 1 hour (60 minutes) before you eat, drink anything other than plain water, or take any other oral medicine (see **"How should I take BONIVA?"**).

What to do if I miss a daily dose:

- If you forget to take your BONIVA 2.5-mg tablet in the morning, **do not** take it later in the day. Just return to your normal schedule and take 1 tablet the next morning. **Do not** take two tablets on the same day.
- **If you are not sure what to do if you miss a dose, contact your health care provider who will be able to advise you.**

What should I avoid while taking BONIVA?

- Do not take other medicines, or eat or drink anything but plain water before you take BONIVA and for at least 1 hour (60 minutes) after you take it.
- Do not lie down for at least 1 hour (60 minutes) after you take BONIVA.

What are the possible side effects of BONIVA?

Stop taking BONIVA and call your health care provider right away if you have:

- **pain or trouble with swallowing**
- **chest pain**
- **very bad heartburn or heartburn that does not get better**

BONIVA MAY CAUSE:

- pain or trouble swallowing (dysphagia)
- heartburn (esophagitis)
- ulcers in your stomach or esophagus (the tube that connects your mouth and stomach)

Common side effects with BONIVA are:

- diarrhea
- pain in extremities (arms or legs)
- dyspepsia (upset stomach)

Less common side effects with BONIVA are short-lasting, mild flu-like symptoms (usually improve after the first dose). These are not all the possible side effects of BONIVA. For more information ask your health care provider or pharmacist.

Rarely, patients have reported severe bone, joint, and/or muscle pain starting within one day to several months after beginning to take, by mouth, bisphosphonate drugs to treat osteoporosis (thin bones). This group of drugs includes BONIVA. Most patients experienced relief after stopping the drug. Contact your health care provider if you develop these symptoms after starting BONIVA.

What is osteoporosis?

Osteoporosis is a disease that causes bones to become thinner. Thin bones can break easily. Most people think of their bones as being solid like a rock. Actually, bone is living tissue, just like other parts of the body, such as your heart, brain, or skin. Bone just happens to be a harder type of tissue. Bone is always changing. Your body keeps your bones strong and healthy by replacing old bone with new bone.

Osteoporosis causes the body to remove more bone than it replaces. This means that bones get weaker. Weak bones are more likely to break. Osteoporosis is a bone disease that is quite common in women after menopause. At first, osteoporosis has no symptoms, but people with osteoporosis may develop loss of height and are more likely to break (fracture) their bones, especially the back (spine), wrist, and hip bones.

Osteoporosis can be prevented, and with proper therapy it can be treated.

Who is at risk for osteoporosis?

Talk to your health care provider about your chances for getting osteoporosis.

Many things put people at risk for osteoporosis. The following people have a higher chance of getting osteoporosis:

Women who:

- are going through or who are past menopause ("the change")
- are white (Caucasian) or Oriental (Asian)

People who:

- are thin
- have a family member with osteoporosis
- do not get enough calcium or vitamin D
- do not exercise
- smoke
- drink alcohol often
- take bone thinning medicines (like prednisone) for a long time

General information about BONIVA

Medicines are sometimes prescribed for conditions that are not mentioned in patient information. Do not use BONIVA for a condition for which it was not prescribed. Do not give BONIVA to other people, even if they have the same symptoms you have. It may harm them.

Store BONIVA at 77°F (25°C) or at room temperature between 59°F and 86°F (15°C and 30°C).

Keep BONIVA and all medicines out of the reach of children.

This summarizes the most important information about BONIVA. If you would like more information, talk with your health care provider. You can ask your health care provider or pharmacist for information about BONIVA that is written for health professionals.

For more information about BONIVA, call 1-888-MY-BONIVA or visit www.myboniva.com.

What are the ingredients of BONIVA?

BONIVA (active ingredient): ibandronate sodium
BONIVA (inactive ingredients): lactose monohydrate, povidone, microcrystalline cellulose, crospovidone, purified stearic acid, colloidal silicon dioxide, and purified water. The tablet film coating contains hypromellose, titanium dioxide, talc, polyethylene glycol 6000 and purified water.

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BON210R0

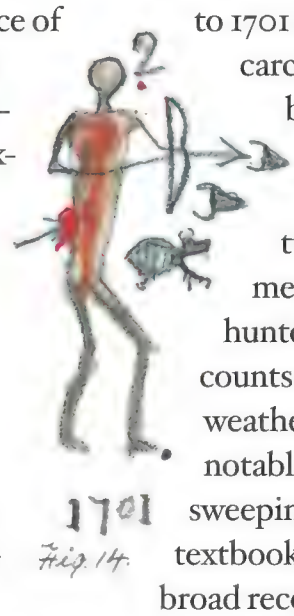
Tribal Art on the Web

A TRADITIONAL LAKOTA ART FORM GARNERS RECOGNITION

To keep track of the years, Lakota "winter count" makers recopied the documents (in undated photo an Indian named Kills Two draws on hide) when they faded.

THE MOST comprehensive exhibition yet of a Lakota Indian art form is on view in an on-line-only show of nearly a thousand images dating to the 1700s. The exhibition offers one of the most detailed glimpses ever of two centuries of tribal history.

The Web site, produced by the Smithsonian's National Anthropological Archives, focuses on "winter counts" kept by the Lakota of the northern plains. A winter count is a large piece of hide, cloth or paper covered in discrete drawings, each one representing an annual memorable event. Extended families had their own winter count keepers, who consulted with tribal elders to select the symbol and add it to the series, typically in winter. The artworks sometimes covered a century. "These are how people remembered their past," says Russell Thornton, a UCLA anthropologist who proposed the project.



The Smithsonian's on-line exhibition (http://wintercounts.si.edu) just won a Webby award, the Oscars of the Internet. The site features ten winter counts spanning the 18th and 19th centuries. The earliest single image refers to 1701 (left) and depicts a buffalo carcass beside a man with a blood-red arrow in his side and the number "2" above his head; the picture has been interpreted to mean the year that two hunters were killed. Winter counts usually recorded quirky weather, intertribal incidents and notable deaths, rather than the sweeping events that make it into textbooks. But some events had broad recognition. All the Smithsonian's winter counts represented the same event for the year 1833: shooting stars, evoking the fall night when people across North America witnessed thousands of meteors blazing through the pre-dawn sky—the Leonids storm, most visible roughly every 33 years.

Several years ago, while studying one of the artworks—until now, available mainly only to researchers—it occurred to Thornton that Lakota today might want to learn more about the art form, which keepers stopped producing during the early 20th century. So along with Candace Greene, a Smithsonian ethnologist and curator, Thornton visited five Lakota reservations and asked how best to make the winter counts material available to Native audiences. "I thought they'd say, 'Put it in a box and ship it right back,'" says Greene. Instead, they argued for making it available to all, saying, "Put it on the Web." —*ANNE BROACHE*

HURRY IN

Calling all artists. Win fame and fortune. Enter a self-portrait or that of a friend or relative by September 6 in the National Portrait Gallery's first annual competition. Details may be found at www.npg.si.edu.

From the gallery's collections: Artist Lee Simonson created his self-portrait (right) circa 1912.

VISIT THE SMITHSONIAN For a free Associates' planning packet, call Smithsonian Information, 202-357-2700 or 202-357-1729 (TTY), 9 a.m.-5 p.m., Monday through Saturday, or send an e-mail to info@si.edu. **INFORMATION CENTER:** Upon arrival, stop at the Smithsonian Information Center in the Castle (9 a.m.-5:30 p.m.). Members are invited to drop by the reception desk (9 a.m.-4 p.m.) to register for a behind-the-scenes tour and to hear about membership benefits. Most museums are open daily, 10 a.m.-5:30 p.m., except December 25.

JOHN ANDERSON / NATIONAL ANTHROPOLOGICAL ARCHIVES, SMITHSONIAN INSTITUTION; DETAIL: NATIONAL ANTHROPOLOGICAL ARCHIVES, S. I.; LEE SIMONSON / NATIONAL PORTRAIT GALLERY, S.I. GIFT OF KARL AND JODY SIMONSON

THIS MONTH IN HISTORY

AUGUST ANNIVERSARIES—MOMENTOUS OR MERELY MEMORABLE

25 YEARS AGO: A STRIKE FOR FREEDOM

Workers in a Gdansk, Poland, shipyard, led by electrician Lech Walesa, 37, begin a strike on August 14, 1980, that eventually spreads to include some 400,000 workers. Their demands are unprecedented: that Poland's Communist government allow free trade unions and grant the right to strike. On August 30 the government accedes, and the Solidarity union quickly grows to ten million members. Walesa becomes Poland's president (1990-95) and wins the Nobel Peace Prize in 1983.

130 YEARS AGO: AQUAMAN

Englishman Capt. Matthew Webb, 27, becomes the first person to swim the English Channel without a flotation device, on August 25, 1875. Alternating between breast and sidestroke, he completes a 50-mile lap from Dover, England, to Calais, France, in 21 3/4 hours. (The current record is 7 hours 17 minutes, set in 1994 by Chad Hundeby.) Webb drowns in 1883, attempting to swim the rapids beneath Niagara Falls.

175 YEARS AGO: A MAN WITH A PLAN

Engineer James Thompson lays out the first plat for the town of Chicago (pop. 100) in August 1830, more than 150 years after the first Europeans set foot there in 1673. Developers hope to sell the lots to settlers to finance a canal from Lake Michigan to the Illinois River. Sell they do, and by 2005, though much of the now outdated canal is buried under freeway, some 2,800,000 people call the nation's third-largest city home.

75 YEARS AGO: BOOP-OOP-A-DOOP

Thirties cartoon sex symbol Betty Boop debuts in producer (above) Max Fleischer's 1930 short, *Dizzy Dishes*—as a dog. The curvy character, drawn by Grim Natwick, appears in several films before her long, floppy ears morph into hoop earrings in 1932. When Betty—in the words of one critic "the sort of girl who goes to parties and loses her head"—runs afoul of production code censors in 1934, she becomes a housewife. But her popularity drops with her hemline, and after 119 cartoons, Betty is retired in 1939.

70 YEARS AGO: A NEW DEAL

To counter the effects of a civilization inclined "more and more to make life insecure," President Franklin Roosevelt signs the Social Security Act August 14, 1935. Its retiree benefits and unemployment compensation make it the first major federal program to provide directly for the economic security of individual Americans. Opponents decry the "government invasion of the private sphere." Today trustees estimate that the program will pay out more than it takes in by 2017, and debate rages over the best way to save the system.

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60 YEARS AGO: SQUARED AWAY

Just days after the atomic bombings of Hiroshima and Nagasaki, Japan surrenders unconditionally, and World War II is over. *Life* photographer Alfred Eisenstaedt catches the spirit of jubilation in Times Square in August 1945, as New Yorkers gather to celebrate V-J Day. At least 14 men and women will claim to be the kissing young sailor and his nurse in what becomes the magazine's most requested photograph. The Japanese sign formal terms of surrender September 2. (For more V-J Day memories, see p. 52.)

—*ALISON MCLEAN*

FROM TOP LEFT: ALAIN NOGUES / CORBIS SYGMA; GRANGER COLLECTION, NEW YORK; CHICAGO PUBLIC LIBRARY; GRANGER COLLECTION; ALFRED EISENSTAEDT / TIME LIFE PICTURES / GETTY IMAGES; KING FEATURES SYNDICATE

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Smithsonian
AUGUST 2005 VOLUME 36, NUMBER 5

Recent attacks on people off the Florida coast are a tragic reminder of the animal's fierce nature. Yet scientists say the terrifying predator is itself in grave danger **BY STEVE KEMPER**

SHARK

It's a good day for fishing on the Gulf of Mexico, hot and breezy, with smooth seas. The eight men and women bobbing on the swells aboard the 50-foot cruiser *Eugenie Clark*, named after a shark research pioneer, are catching sharks, not for fun or food but for information. They're affiliated with the Mote Marine Laboratory's Center for Shark Research in Sarasota, Florida, and their sometimes risky work is generating important new insights into how these notorious but surprisingly little-understood creatures live. Just now, four of the scientists are hauling in a wildly thrashing, nine-foot-long lemon shark. "OK, guys, lemons are nasty," warns biologist Jack Morris, wearing a T-shirt stained with grease and blood. "They'll even bite the metal platform on the boat."

Biting is one of the things sharks do best, as several dozen swimmers, surfers, snorkelers and divers are horrified to discover each year. Although some attack victims have time to fight back, others never know what hit them. This past June, in Destin, Florida, 14-year-old Jamie Marie Daigle was swimming on a boogie board about 100 yards offshore when she was attacked by a bull shark. She bled to death, probably even before she reached the beach. Two days later, about 80 miles southeast of Destin, Craig Hutto, 16, was bitten by a shark while fishing in waist-deep water; his leg had to be amputated. Diving for abalone on the Mendocino coast just north of Fort Bragg in California last August, Randy Fry, 50, was decapitated. Near Adelaide in December, 18-year-old Aussie surfer Nick Peterson was ripped almost in two. Both had fallen prey to great white sharks.

With more people spending more recreational time in the water, the number of shark attacks has risen steadily, peaking in 2000 with 78 attacks and 11 deaths. Since then it has slacked off somewhat: 61 men, women and children experienced violent encounters with sharks last year; 7 died. Biologist George Burgess, director of the Florida Program for Shark Research at the University of Florida in Gainesville, is not reassured: "I think we will see more attacks in this decade than we did in the last one."

Predator turned prey: More than 60 countries ban the killing of sharks for their fins (on sale in Thoothoor, India), but shark-fin soup remains an Asian delicacy.

As novelist Peter Benchley understood so well when he wrote his 1974 bestseller *Jaws*, the mere prospect of a chance encounter with a shark—any shark—is nightmarish. Never mind that on average, for every American killed by a shark, 37 are killed by snakes and 45 by pet dogs. Whenever a shark-caused human fatality occurs, it makes headline news. But the real story is not the rare threat that sharks pose to us, tragic as individual cases invariably are, it's the profound harm we are doing to them. Before too much longer, we may reduce many shark species' once-teeming numbers to a remnant few.

Decades of commercial fishing have devastated shark populations in every quarter of the globe. According to the World Conservation Union (IUCN), a Switzerland-based scientific and governmental consortium that keeps tabs on endangered plants and animals, nearly two dozen shark species have been driven to the brink of extinction. "They are in such distress," says Burgess, "that even if all fishing and killing stopped right now, we're still talking about a recovery that would take decades." And if those species don't bounce back? There will be "serious

JEFFREY L. ROTMAN; P. 42 STUART WESTMORLAND / GETTY IMAGES

Slaughtering sharks for their vitamin A-rich liver oil (in Keel Harbour, Ireland, 1954) began in World War II. The oil is still being used in some cosmetics and topical medications.

HULTON-DEUTSCH COLLECTION / CORBIS

and unforeseen consequences," says Ramón Bonfil, a fisheries expert with the Wildlife Conservation Society in New York City. He warns that the loss of one of the ocean's top predators could throw the entire marine ecosystem out of whack. "We need to use a lot of caution," he says.

Most marine researchers and conservationists agree that sharks are victims of the same go-for-broke mentality that over the years has ravaged cod, bluefin tuna and orange roughy populations. The fishing industry, seemingly having learned little from those fiascoes, still deploys gigantic fleets that relentlessly deplete shark species while national and international regulatory agencies quibble over "management plans" that offer too little protection too late. "It took many years before fisheries management cared about sharks," says Robert Hueter, a biologist who directs the shark lab at Mote.

Data on the number of sharks being taken worldwide are sketchy or outdated. The United Nations Food and Agriculture Organization (FAO) estimates that 100 million sharks, skates and rays are fished each year. This is more than 850,000 metric tons caught—an amount that has nearly tripled since 1950. The agency says these numbers are almost

STEVE KEMPER wrote last for SMITHSONIAN about the Scopes trial. Assistant Editor ANNE BOLEN contributed additional reporting.

certainly too low, due to underreporting by many of the at least 125 nations engaged in the shark trade. The amount killed accidentally by fishermen seeking other prey may double the size of the catch. With the harvest valued at some $750 million annually, "the future is pretty ominous," says Jeffrey Graham, a marine biologist with the Scripps Institution of Oceanography in La Jolla, California. "As long as money is to be made and the economics of scale are at work, sharks will be increasingly sought after."

THE PLUNDER BEGAN in earnest during World War II when fishermen started harvesting sharks for their liver oil, a source of vitamin A. Since then, humankind has found many other uses for sharks. Their oil goes into cosmetics and hemorrhoidal medications. Shark cartilage is promoted as an alternative medicine for everything from arthritis to cancer. Teeth are turned into jewelry and jaws into souvenirs. Millions of sharks are harvested each year for their meat, as well as for their hide, which is used to make shoes, belts, purses and wallets. Millions more are caught and thrown back after their fins have been cut off for shark-fin soup, a popular delicacy in Asia; shark fins sell for $20 a pound and up.

The slaughter has taken its toll. Researchers at Nova Scotia's Dalhousie University reported two years ago that many Atlantic shark populations "have declined by more than 50 percent in the past 8 to 15 years." They estimated hammerheads have plummeted nearly 90 percent; great whites and threshers by about 80 percent; oceanic whitetips by 70 percent.

Depleted populations are hard-pressed to come back because, as one researcher puts it, sharks "have so many biological Achilles' heels." Many species don't mate until they're in their teens, and then may bear small litters only once every two years. Most give birth to live young. Such traits have served sharks well for eons, but today we're eliminating the animals faster than they can reproduce. The annihilation is happening just as science is beginning to learn some of the most basic facts about sharks—where they live, where they go, how they behave and what roles they play in the balance of marine life.

Large drift nets are banned by some countries because they do not discriminate among species (a young hammerhead in the waters off Durban, South Africa).

JEFFREY L. ROTMAN

Sharks began prowling the seas some 400 million years ago. They belong to the group of fishes known as elasmobranchs that also includes rays and skates. Elasmobranchs lack the air bladder that gives other fishes buoyancy, and their skeletons are made of light cartilage instead of bone. Sharks are found in deep ocean and shallow coastal waters. Although they dwell primarily in saltwater, some swim into and even inhabit freshwater, hunting smaller fish and other aquatic organisms in the mouths of rivers and sometimes far upstream. (In 1937, two fishermen caught a 84-pound bull shark in the Mississippi River near Alton, Illinois, 1,740 miles from the Gulf of Mexico.) Sharks range in length from the six-inch dwarf lanternshark to the 60-foot whale shark.

Sharks glide through our history, our literature and our art, sinister, awe-inspiring, captivating. The Greek historian Herodotus wrote, in 492 B.C., the first-known account of a shark attack, describing "sea monsters" that devoured shipwrecked Persian sailors in the Mediterranean. Centuries later, another Greek, the poet Leonidas of Tarentum, immortalized a sponge diver named Tharsys, who had the misfortune to be bitten in two. Not surprisingly, sharks showed up prominently in the mythology and religious ceremonies of many ancient cultures, from West Africa and Australia to South America and Hawaii. Often, they were invested with talismanic powers. The Maya considered them sacred but evil, engraving their word for shark on stone and using their teeth in rituals. Polynesians in Hawaii regarded some sharks as guardian spirits called "aumakua." During the 1700s and 1800s, legend has it, Hawaiian royalty proved their bravery by roping a shark and riding it like a bull before killing it.

When explorers and trade ships set sail, sharks accompanied them, eagerly scavenging garbage, and the occasional corpse, thrown overboard. Sailors believed sharks could smell death and were an omen of someone's imminent demise. In whaling days, sharks swarmed around carcasses fastened to oil-processing ships. "Since they have such a ravenous finger in the pie," cautioned Ishmael, the narrator of Herman Melville's *Moby Dick*, "it is deemed but wise to look sharp to them."

One of the most horrific encounters between sharks and sailors in modern times occurred in 1945, after a Japanese submarine torpedoed the destroyer USS *Indianapolis* in the South Pacific. Before rescuers could arrive, the terrified survivors drifted for four days, hounded by hundreds of sharks. Of the nearly 1,200 men onboard, about 880 went into the water and only 317 came out, an episode chillingly recounted in Stephen Spielberg's 1975 movie version of *Jaws*.

Over the years, sharks have paid dearly for being true to their nature. In 1916, after five people were attacked in just 12 days off the coast of New Jersey, vigilantes went up and down mid-Atlantic waters killing every shark they could find. Franklin Roosevelt and Ernest Hemingway may have had little else in common, but like many other 20th-century sportsmen, both were enthusiastic shark killers. Hemingway's weapon of choice on his fishing boat in Cuba, the *Pilar*, was a

Thompson submachine gun. Roosevelt and guests aboard his Florida houseboat in 1926 set bait for sharks at night, dispatching the ones they attracted with a revolver. "The next day it was impossible to swim near the boat," reported one visitor, "for many sharks would be attracted by the blood."

Sensationalism that demonizes sharks has long been a staple of news media coverage, perhaps nowhere more so than in Florida, where attacks far outnumber those anywhere else in the United States—151 during the past five years, compared with 23 in Hawaii and 15 in California. About half of the Florida attacks take place a few miles south of Daytona at New Smyrna Beach, one of the best-known surfing spots on the East Coast. "It's almost a badge of honor to get bitten, get stitches and get back in the water," says Joe Wooden, the retired deputy chief of the beach patrol for Volusia County, which includes New Smyrna and Daytona.

Each year, eight million swimmers and sunbathers crowd onto the beaches of Wooden's former beat. In 2001, after 22 people were bitten, 10 within 11 days, the media went into a feeding frenzy. "At one point, there were 39 satellite trucks waiting for the next attack," Wooden recalls. One national TV news reporter, determined to do a story about attacks, was disappointed to find Wooden dealing instead with two drownings and two people struck by lightning. That night, Wooden says, the reporter—not to be denied—opened his story with stock footage of a great white ripping into bloody meat.

Lately, screenwriters and movie producers have been giving sharks a break. A kinder, gentler approach has been reflected in such recent movie characters as *Finding Nemo*'s Bruce the Shark and *Shark Tale*'s Lenny, the easygoing vegetarian. Not to overlook Bill Murray's striking turnabout, in *The Life Aquatic with Steve Zissou*, from vengeance against a shark to awe at its power and beauty.

Why this new view of sharks? It may be that the facts are catching up with fantasy—and fear. "Attention to sharks and awareness about sharks have grown dramatically in the last 10 or 15 years," says Sonja Fordham, a shark advocate for the Ocean Conservancy, headquartered in Washington, D.C. To be sure, researchers—"heroes to us shark fanatics," as Peter Benchley calls them in his nonfiction book *Shark Trouble*—have managed to redefine sharks in dramatic and even sympathetic ways. Ichthyologist Eugenie Clark demonstrated in the 1950s that lemon sharks could learn not only to ring a bell for food but also differentiate between shapes, revealing a level of intelligence previously unsuspected. Clark founded the lab that became Mote, whose Center for Shark Research is the world's largest facility devoted to the elasmobranchs.

During the 1960s, Donald Nelson and Samuel Gruber, biologists with the University of Miami, showed that sharks are attracted to sounds and pressure oscillations, such as those produced by dying fish. John McCosker's adventurous fieldwork in the 1980s confirmed others' research that indicated great whites, unlike most fish, are warmblooded (as are makos and salmon sharks). Their ability to maintain body heat in a wide range of water temperatures gives them a range far greater than had once been suspected. McCosker, a biologist at the California Academy of Sciences in San Francisco, also reported that the great white stalks prey from below and behind before taking a massive bite, then waits until its victim bleeds to death before feeding. During three decades spent swimming with hammerheads, Peter Klimley, now a biologist at the University of California at Davis, concluded that they navigate by sensing magnetic "roads" that radiate from underwater mountains.

We know that shark skin is covered with millions of tiny toothlike scales called dermal denticles. They not only make the skin rough; they increase its durability and may help reduce drag. Some species have a clear membrane they can see through that slides over the eye to protect it. A shark may have as many as 20 rows of teeth. When one tooth falls out, another replaces it. A mako's fanglike front teeth enable it to grab slippery fish and squid; a great white's triangular teeth are serrated, like a saw, for cutting and tearing large prey. Philip Motta, at the University of South Florida in Tampa, says a tiger shark's jaws are so strong its teeth can bite through a sea turtle's one-inch-thick shell: "I've seen turtles that have been bitten in half." One of Motta's graduate students, Dan Huber, has determined that horn sharks only about two feet long bite with 75 pounds of force. What would that feel like? "Imagine taking a 75-pound dumbbell," Huber says, "attaching a bunch of tacks on the end and dropping it on your fingers over and over again."

Heupel found that up to 90 percent of the blacktip shark pups (a one-month-old bull) that she tracked with implanted transmitters died in their first year.

Sharks are "among the best-equipped sensory machines" on the planet, says Hueter. The tiny black dots that cover their heads like a five o'clock shadow are pores that lead to the ampullae of Lorenzini, named after the Italian biologist Stefano Lorenzini, who described them in 1678. The pores connect to canals filled with a conductive gel and then sensory chambers that detect tiny electric fields that animals give off. Like other fish, sharks also sense vibrations through

MOTE MARINE LABORATORY

CARLTON WARD

Measuring a thrashing nurse shark in the water requires an alert crew. "You have to watch that tail," Mote director Hueter (at center) calls out. "They can whack you and do damage."

their lateral lines, the receptors that run beneath the skin from tail to snout. The animals' legendary sense of smell can detect blood and body fluids suspended in the water in minuscule amounts—down to parts per billion.

Methods of attack vary. Threshers stun prey with their scythe-like tails. The 20-inch-long cookie-cutter latches onto a big tuna with its sawlike teeth and spins to cut out plugs of meat. Hammerheads can pin rays to the sea's bottom and bite off a wing. Makos, among the fastest of sharks, chase down their prey. Slower species, such as the tiger, rely on stealth and explosive power. Then there is the nurse shark, which vacuums its prey from crevices: "They can suck so hard they create a vacuum," Motta says, "and take only fifty milliseconds to open their mouth and engulf their prey."

Among the multitude of basic things researchers still do not know about sharks is the number of species. Some say that the count is up to around 500 and that more species remain to be discovered. "There's so much uncertainty in the data," says Hueter. "These animals are difficult to work on physically, logistically and statistically."

LOW-KEY and with a reddish beard, Hueter is one of the "fishermen" on the *Eugenie Clark*. Around him, the deck is crowded with buoys, boxes of frozen bonito (bait) and containers of large hooks. Four times a year, Mote scientists spend a week on the Gulf conducting shark surveys, which entail letting out a mile-long line with baited hooks, then reeling it back in on a motorized drum. When Hueter sees the first catch of this day, he says, sounding bored, "Oh, a nurse shark." When he sees the second one, an aggressive bull shark more than six feet long, he yells, "Grab his head!"

As the shark nears the stern, two biologists do exactly that by hauling hard on the line while two others try to slip a rope over the beating tail. After maneuvering the beast onto the dive platform, four crew members lean on it while a fifth begins the work of science, determining its sex, taking measurements and attaching tags with information about the lab and an identification number. An orange plastic tag about the size of a large paper clip is attached to the dorsal fin and another tag goes just below the dorsal in the back muscle. Sometimes small snippets of a fin are cut off for genetic samples. The bull is then released, tail first, and wiggles off. "If you let the head go first," says Hueter, "sometimes the last thing the shark does is turn all the way back to bite. But you also have to watch that tail—they can whack you and do a lot of damage."

In eight hours, the team catches four nurse sharks, three bulls and four blacknoses. The next day they catch 11 more—the usual nurses plus three blacktips and two lemons. One of the lemon sharks is wearing a Mote tag that

reveals it was caught nearly two years ago in the same area and has grown six inches.

Since 1991, Mote scientists have tagged and released more than 13,000 sharks in the Gulf, from mid-Florida down to the Keys. Hueter says, "We have learned a lot about migration routes, stock distribution, critical habitats, life history patterns, and changes in abundance over time."

Other questions are also coming into focus. It has long been assumed that about half of all shark pups die within a year of birth. But after Mote staff biologist Michelle Heupel tagged more than 100 blacktip pups, surgically implanting transmitters that enabled her to track their every move, she found that up to 90 percent of them died within a year, most in the first four months. That finding may eventually lead to changes in fishing regulations promulgated by the National Marine Fisheries Service (NMFS), such as closing nurseries to fishing at particular times.

Heupel's investigations led to another surprise. As expected, she observed that young blacktips headed south for warmer waters in the winter but, contrary to expectations, the following year many of them swam right back to their nursery grounds. Considering sharks' reputation as wandering loners, this was a startling revelation. Heupel, Hueter and others have found evidence of similar homing behavior in other shark species. "It's not as dramatic as with salmon," Hueter says, "but it's similar. We believe sharks' navigational ability is more sophisticated than we've suspected and that they are going to specific parts of the ocean at specific times of the year. That has implications for fisheries management." If sharks return to certain areas to mate or give birth, those areas can be closed at such times to help depleted populations recover. NMFS ordered one such closing this year off North Carolina, to protect breeding sandbar and dusky sharks.

"I think we will see more attacks in this decade," says one biologist. (In June, a shark cruised Florida Panhandle beaches the day after a fatal attack in nearby Destin.)

New research has similarly confounded the conventional wisdom about great whites on the West Coast, which has long held that adults spend most of their time cruising the shallow feeding grounds off California and Baja, seldom diving deeper than 100 feet. Now it turns out that they often swim at great depths, between 900 and 1,500 feet and sometimes below 2,000. Researchers have learned that great whites abandon their supposed coastal haunts each winter, migrating hundreds of miles to a landless destination halfway between Hawaii and Baja. What they do there no one knows. "We can't observe them directly, so that still remains a mystery," says Andre Boustany, a biology doctoral student at Stanford University.

It was Boustany who, along with four colleagues, put tags on more than 20 great whites that transmitted their whereabouts to a satellite accessed by computers at Stanford's Hopkins Marine Station in Pacific Grove, California. The tags were affixed to the sharks with a pole wielded by Boustany and co-workers in a 17-foot flat-bottom skiff that was smaller than some of the sharks alongside it.

THE REVELATION that great whites spend so much time in international waters means they are more susceptible to overfishing than experts previously supposed. Last fall, in response to a petition spearheaded by the Wildlife Conservation Society's Bonfil, the majority of the 167 nations belonging to the Convention on International Trade in Endangered Species, or CITES, voted to strengthen safeguards for the beleaguered predator; their governments have agreed to classify the great white as an Appendix II species, meaning it is vulnerable to overfishing and is eligible for special protection. "A huge victory," says Burgess.

One of Boustany's partners on the great white project is Stanford biology professor Barbara Block, who studies sharks and other marine species using "satellite tags" she and her colleagues attach to the animals; the devices monitor ocean depth, light, location, pressure and water temperature every 30 to 60 seconds and transmit the data to satellites and from there to computers in the scientists' lab. "The fish becomes a sensor of its own environment—an oceanographer," says Block. Swiveling to her computer in her office at the Hopkins Marine Station, she taps a few keys. "This is where they are today," she says, pointing to squiggly lines on a map of the northern Pacific. Each line represents a tagged shark. "Most of us grew up only dreaming about this," she says, "and now we're doing it—work that's crucial to the future of these species." How crucial remains to be seen, Burgess says. "If we can't transfer the science into the management, it doesn't matter how many studies we do."

In the United States, shark management is the job of NMFS. In the 1980s, the agency encouraged commercial fishermen to catch more sharks, to spare other overfished species. Within a decade, many shark species had crashed, but not until 1993, after repeated warnings by alarmed scientists, did NMFS finally implement a management plan for

JASON C. MILLER / AP PHOTO

Blacktip reef shark (*Carcharhinus melanopterus*)
Shortfin mako shark (*Isurus oxyrinchus*)
Whale shark (*Rhincodon typus*)
Blue shark (*Prionace glauca*)
Lemon shark (*Negaprion brevirostris*)
Nurse shark (*Ginglymostoma cirratum*)
Tiger shark (*Galeocerdo cuvier*)
Sandbar shark (*Carcharhinus plumbeus*)

BRANDON COLE; RICHARD HERRMANN; STUART WESTMORLAND / GETTY IMAGES; ANDREW SALLMON / MONDRAGON PHOTOGRAPHY; DOUG PERRINE / JEFFREY L. ROTMAN; BRANDON COLE (2); MICHAEL PATRICK O'NEILL

Some mostly solitary species (such as these whitetip reef sharks near Costa Rica) gather to feed or mate.

Atlantic sharks that stipulated seasons, size and catch limits and other restrictions, including an annual quota of 2,436 metric tons for large coastal shark landings within the 200-mile limits of United States waters. Scientists insisted the initial quota was too high, so in 1997 the agency cut it in half. Since then, commercial fishermen have sued to raise it, conservationists have sued to maintain or lower it, and the agency has vacillated. The current level in effect is almost double an advisory group's latest recommendation, in 2002.

"I have mixed feelings about the plan," says Fordham of the Ocean Conservancy, one of the environmental organizations that sued NMFS to lower or maintain quotas. "For years, the quotas were not in line with scientific advice." She is especially concerned about the depletion of hammerheads, porbeagles, duskies and sand tigers. "That said, [this is] one of the most comprehensive shark-management plans in the world."

How much difference will it make? One key provision of the NMFS plan prohibits catching 19 depleted Atlantic species. But fishermen's hooks and nets are not selective. "Some sharks die more easily [than others] on a hook," adds Burgess. "Almost 100 percent of hammerheads come up dead, and 70 percent of duskies."

Most shark scientists want NMFS to outlaw shark fishing altogether at times and places where the animals are breeding or giving birth, as it has done off North Carolina. Fishermen detest such blanket restrictions, which are hard to justify without lots of supportive data—and in most cases, scientists don't yet have it.

On the West Coast, biologists David Holts and Susan Smith work out of NMFS's cliffside offices overlooking La Jolla, California. There, they keep a worried eye on data from surveys and landings because they know the consequences of inattention. "For a long time, the administrative people here weren't interested in sharks," says Holts, his bearded face ruddy from participating in a recent survey. In the 1940s, West Coast fishermen began targeting the then-abundant tope shark for its oil. Today, Holts says, topes are still drastically reduced from their former numbers. "They never really recovered."

Fisherman Mike Flynn (in June) says regulations to protect sharks makes his life more difficult, but he agrees that protecting nursery grounds is necessary.

CHAD SHATTERT; P. 50 JEFFREY L. ROTMAN

As sharks have diminished on the West Coast, so, too, has the once robust fishing fleet—from 250 drift-net boats in the mid-1980s to about 50 today. These fishermen are mostly targeting swordfish, but will sell any tuna or deep ocean sharks they might also catch. These days, NMFS seems determined to keep the clamps on, restricting permits, catch limits, seasons and locations. One goal is to help sustain remaining populations of threshers and makos. But beyond U.S. waters, long-distance swimmers such as makos and blue sharks must survive swarms of fishing fleets, from small craft to what Smith calls "the gauntlet of the high seas"—long-line boats.

True, countries such as the United States, Australia and some in Africa now have shark management plans; other nations have some regulations in place; and still others protect a few species. But shark fishing remains wide open and unregulated nearly everywhere else. "It's like having a herd that roams over an entire prairie," says Mote's Hueter. "You can manage your part, but if your neighbors kill everything on their parts, the herd as a whole suffers."

Too many countries are ignoring scientists' warnings about the limits of natural systems. Gregor Cailliet, the program director at California State University's Pacific Shark Research Center, in Moss Landing, California, says that young sharks are being taken before they are able to reproduce. "Pacific angel sharks mature at 12 or 13 years, when they're three feet long. But the international fishery takes them down to less than that," he says. "South Korea, Japan and China, among many other countries, are taking a *lot* of immature sharks."

In Tuna Harbor, the home of San Diego's commercial fishing fleet, a deeply tanned fisherman stands on a pier in the middle of a big green net, mending mesh torn by sharks caught inadvertently along with swordfish. He's angry about environmentalists, which, he says, are putting American boats out of business. "I chased my kids out of the business because this is no good," he says. But nearby, fisherman Mike Flynn wipes his oily hands with a rag and leans on the rail of *Baby Joe,* his 40-foot steel fishing boat, in which he invested nearly $70,000—a large gamble on the future. Restrictions have hurt his income, he says, but he realizes that they help protect nurseries for sharks and swordfish, and other young ones. "That's our future."

NO ONE would blame Rodney Orr if he hated sharks and applauded their demise. One afternoon 15 years ago, he was diving for abalone in the swaying kelp beds off Russian Gulch Beach in California's Sonoma County when a great white maybe 17 feet long seized his head. The shark swam some distance with Orr in its massive jaws, then spat him out and disappeared. Orr's nose, neck and cheekbone were punctured. A row of holes ran up his skull. In the end, he required 75 stitches. The following weekend Orr went diving. Now 64 and recently retired as an electrician, he has hardly missed a weekend since. Orr hates the idea of a sea without sharks. "It's their ocean," he says. "They were here first and I hope they always will be. If they were gone, part of the excitement and mystique of the water would disappear."

IT'S OVER!

We asked readers to tell us where they were and how they reacted to the news that World War II had ended. And what a response we got

August 15, 1945 was a glorious day never forgotten. The war was finally over and we would be returning home.

HOMEFRONT

ON V-J DAY, I was only 7 years old, but the memory is crystal clear. We were living in a government housing project in Michigan, and there were virtually no men between ages 18 and 40 in that community of several hundred women and children. After V-E Day, some dads had come home for extended leaves, and the project was a happy place. Those with people fighting in the Pacific knew that we'd win over there, too, and when it finally happened, the place went nuts: uncontained joy reigned, and when my friend Bobby Phillips came running down the street, he hollered "Come with me!" I followed him to the project office, where Bobby grabbed a lawn mower. He went out to the schoolyard and began cutting a huge V in the middle of the field. Some friends saw us, and they ran to get more mowers. By the time we were finished, the V we mowed in that field was almost 200 feet long and 150 feet wide. We pledged that the V would be kept mowed until our heroes came home and saw it, and through the winter of 1945, it was clearly visible, even when the snow fell.

In 1957 I took my fiancée to show her where I'd spent an important decade of my life. As we walked across the schoolyard, I saw the V as clearly as if I'd just mowed it; she didn't see it at all.

RICHARD F. MCHUGH
GATLINBURG, TENNESSEE

ON THE DAY World War II ended, I had but recently returned from serving with the 877th Signal Service Company, 9th Air Force Support Command, in Europe. Now on furlough, I was lunching with Mrs. Rhoda Chase, an old family friend, at a Chinese restaurant on Broadway, in Times Square, in New York City. As we ate, we casually watched the electric "moving" sign on the Times News Building, when we read: "PRESIDENT TRUMAN HAS ANNOUNCED JAPAN HAS SURRENDERED UNCONDITIONALLY. THE WAR IS OVER."

Jubilation breaks out in Times Square, August 15, 1945.

People in the restaurant were screaming with joy, hugging each other, and crowds were gathering in Times Square. Mrs. Chase, who also had a son in the Army, got up, ran to the bar, and bought me a fifth of Southern Comfort.

"Get out of here, Howard," she said. "This is no time for a soldier to be sitting around chatting with an old lady. The war is over. Go celebrate, have fun."

I took her advice. I celebrated, and here I am 60 years later, a husband, father and grandfather whose family includes my German-born wife, whom I met while serving in Berlin during my second enlistment (1949-50), and a Japanese daughter-in-law, married to one of our sons, a Navy SEAL.

My war is over. Life is good.

HOWARD ELLIS
MORENO VALLEY, CALIFORNIA

CORBIS; P. 53 PETER GARFIELD / ALICIA MARIS, STYLIST

K-32-1
WESTERN UNION (06)
SYMBOLS
DL = Day Letter
NL = Night Letter
LC = Deferred Cable
NLT = Cable Night Letter
Ship Radiogram
CLASS OF SERVICE
This is a full-rate Telegram or Cable-gram unless its character is indicated by a suitable symbol above or preceding the address.
CA676 47 GOVT=WUX WASHINGTON DC 26 3 3P
MRS MARY E HILL=
523 CALIFORNIA AVE PORA=
THE SECRETARY OF WAR HAS ASKED ME TO EXPRESS HIS DEEP REGRET THAT YOUR HUSBAND S/SGT HILL HARY R HAS BEEN MISSING IN ACTION IN PACIFIC OCEAN AREA 3 JUL 45 IF FURTHER DETAILS OR OTHER INFORMATION ARE RECEIVED YOU WILL BE PROMPTLY NOTIFIED CONFIRMING LETTER FOLLOWS=
EDWARD F WITSELL ACTING THE ADJUTANT GENERAL OF THE ARMY
In grateful memory of
Staff Sergeant Harry R. Hill
died in the service of his country
the Pacific Area, July 3, 1945.
OKEN LINE OF PATRIOTS WHO HAVE DARED TO DIE
LIVE, AND GROW, AND INCREASE ITS BLESSINGS.
VES, AND THROUGH IT, HE LIVES–
ABLES THE UNDERTAKINGS OF MOST MEN
PRESIDENT OF THE UNITED STATES
Miss HAP

Mary Hill spent V-J Day in church praying for her husband's safe return. A radio operator on a B-29, he had been declared missing in action after a July air raid.

FOR ME, the end of World War II did not mean rejoicing and dancing in the street. I was a young mother living in the town of Laurel, Mississippi, with two small children and very little food and money. My husband, Aubry, a fighter pilot, was missing in action somewhere near Rome, Italy. It would be a whole year before he was officially declared "killed in action." The only news I ever finally received about his death was that he had been firing on German vehicles when he radioed that his plane had been hit.

Aubry had left to go overseas without knowing for certain that I was pregnant. I received many letters from him, but wished he knew that we had a second daughter, whom I named after him. Sadly, all my letters came back after his death in one package, unopened.

During the anxious months of not knowing what had happened to Aubry, I focused on our two little girls, Mary and Aubrey. To help with our food problem, I planted a vegetable garden. To make us smile, I planted lots of bright flowers.

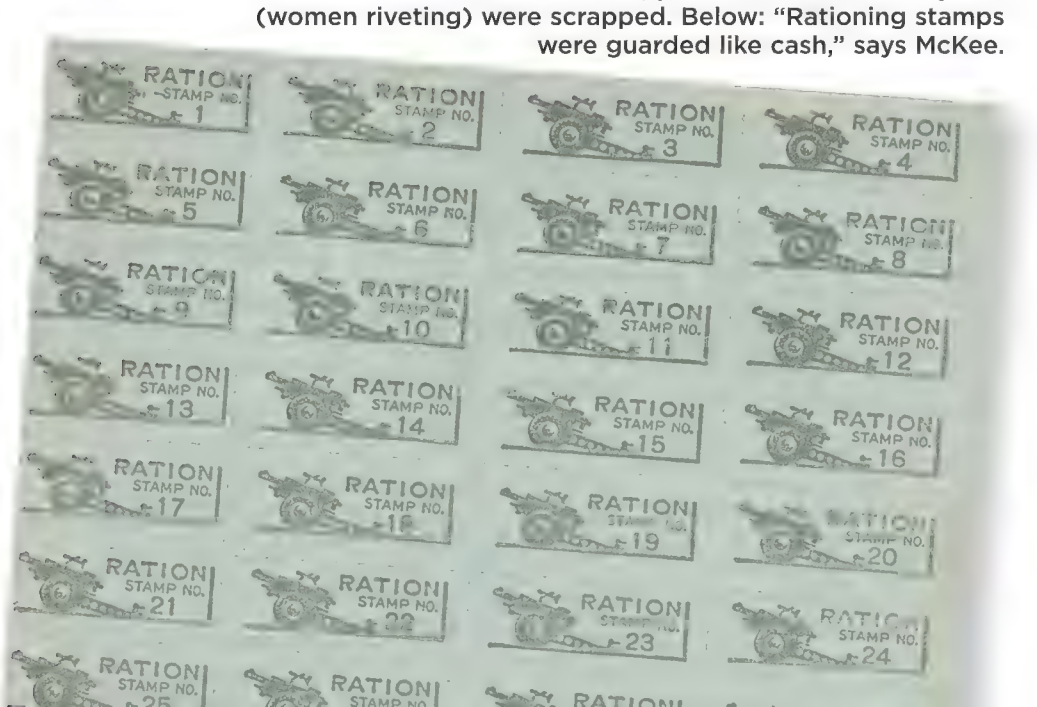
Each night I would go to bed exhausted from all the work, but knowing I had done the best I could do. Before falling asleep, I would thank God for helping us get through another day. Then I would look at my two daughters, peacefully sleeping beside me, and know that no matter what happened, Aubry's brave and gentle spirit was with us.

ODEAN FONDREN
HENDERSONVILLE, NORTH CAROLINA

DURING THE WAR, gasoline-rationing stamps were guarded as carefully as cash. One warm summer day, the few cars that traveled our country road were incessantly honking. Dare we hope? We turned on the radio and learned that it was true. The war was over. My father asked if I wanted to go for a ride with him, a rare treat. Of course I wanted to go. He drove a few miles to a country store and gas station. My father snapped his suspenders for emphasis when he told the owner to "fill 'er up. And spill a little." When our prized possession, a 13-year-old car, was full, he spilled a few ounces on the drive. For both my father and the owner, the most extravagant expression of celebration imaginable was to waste gasoline. The look between them and their silent handshake burned into my 8-year-old brain.

FRED MCKEE
BETTENDORF, IOWA

Above: After the war, planes on the assembly line (women riveting) were scrapped. Below: "Rationing stamps were guarded like cash," says McKee.



IN 1945, I was working in a textile factory in Cambridge, Massachusetts. The factory had previously manufactured curtains but now was making U.S. Army coats and jackets. The bulk materials were cut into patterns; the seamstresses stitched the coats and jackets, and others folded them and prepared them for shipping.

All of the women worked together, but I was specifically involved with the team folding and preparing the jackets for shipping. One of the things we always took it upon ourselves to do was to put cheery notes in the jacket pockets like "You are in our prayers," "We are thinking of you and your safe return," "We have not forgotten you," and "A big thank you from all of us." We knew a soldier would find the note and perhaps it would brighten his day. After all, everyone knew someone in the Army.

I remember August 15 very clearly. It was announced over the loudspeaker that the war was over. The hum from the sewing machines stopped, and everyone stood in shock. For a moment, there was complete silence. Then women started crying, screaming and hugging each other. Most of us went to the Boston docks to join other workers from around the city to rejoice. It's a day I will always remember!

ANN FERRARA JANUARIO
LYNN, MASSACHUSETTS

I WAS 11 YEARS OLD when I learned that World War II was over. My family lived on a small poultry farm on the outskirts of town, in Santa Ana, California, the county seat of Orange County. At least four miles separated us from the center of town, those miles covered in lima bean fields, orange groves and berry farms.

I remember that it was the Feast of Assumption and we had been to Mass that morning. Then the quiet of a warm summer afternoon was broken by the distant sounds of church bells, car horns, sirens, the startling whistle at the packing house; my first reaction to this strange combination of sounds was confusion. Neighbors were few and far between on Edinger Road, where we lived, and my parents and I couldn't imagine what on earth was happening to cause all the noise. Instinctively, we walked toward the road, where I had spent so much time the past few years waving to the soldiers who were part of the daily traffic of Army convoys that made their way to and from the Santa

ALFRED T. PALMER / LIBRARY OF CONGRESS, PRINTS AND PHOTOGRAPHS DIVISION

Ana Army Air Base. But today it was a different type of convoy. We could hear the approach of cars with horns honking, and then we saw people hanging out the windows of the cars shouting, "The war is over, the war is over!" We waved, jumped up and down, and shouted back at the people in the cars. What wonderful news! What a great day!

YSABEL COSTANZA
RENTON, WASHINGTON

I HEARD THE NEWS of Japan's surrender on my car radio. I was on assignment as a Lockheed Aircraft resident inspector in downtown Los Angeles. Of course, there was a lot of celebrating going on in the streets and a great feeling of relief. The other emotion was "now what"? I called my manager at Lockheed and was told that the plant would be shut down immediately to regroup and decide on what course to take. Aircraft production was immediately stopped and layoffs began. Planes were taken off the assembly line and taken outside to be scrapped. The story was that they were cut up with radio, instruments, etc., still intact. Those days were a mixture of joy, relief that the war was over, and some apprehension.

CARL WILKINS
SUNNYVALE, CALIFORNIA

I WAS 11 YEARS OLD. I had three brothers serving in World War II, three brothers-in-law, other relatives and friends. During those years my mother and older sisters sent dozens of boxes of cookies and other foods to them. I remember one brother saying, "I knew that as soon as those Army boys saw my box, I would get only one cookie, if lucky, maybe two." I had an uncle and a cousin killed in World War II, and my sister's brother-in-law was killed as a fighter pilot.

Including my parents, we were a struggling farm family of 12 living in the far southeast corner of Nebraska along the Missouri River bluffs. Little did we know about soda pop and junk food. But every year, only on the Fourth of July, my father would bring home a wooden case of pop. Those wooden cases came in handy! On a typical summer day, after we heard by radio that the war had ended, my father surprised us with a case of pop. Cream, strawberry, root beer and orange. There were six of us at home, so that meant that each of us got four bottles of pop. I chose one of each kind, and what a great and never-to-be-forgotten celebration we had!

LILA MEYERKORTH
SHUBERT, NEBRASKA

ON JULY 16, 1945, at 8:45 p.m., I received a telegram that my husband, Staff Sgt. Harry R. Hill, a radio operator on a B-29, had been missing in action following an air raid over Shikoku, Japan, on July 3, 1945.

I was employed as the chief clerk at one of the Selective Service Boards in Peoria, Illinois. My husband's mother and our 6-year-old son resided with me. Peoria erupted in celebration at the news the war was over, but my cousin, whose husband was stationed in Europe, her 2-year-old son, my husband's mother, my son and I attended services at the Episcopal Church across the street from the federal building where the Selective Service offices were located.

Our prayers for my husband's safe return were not realized. His body and those of the members of his crew were found in December 1945.

MARY E. HILL DUNCAN
ALBUQUERQUE, NEW MEXICO

Lockheed plants were camouflaged; Wilkins and his wife, Patricia.

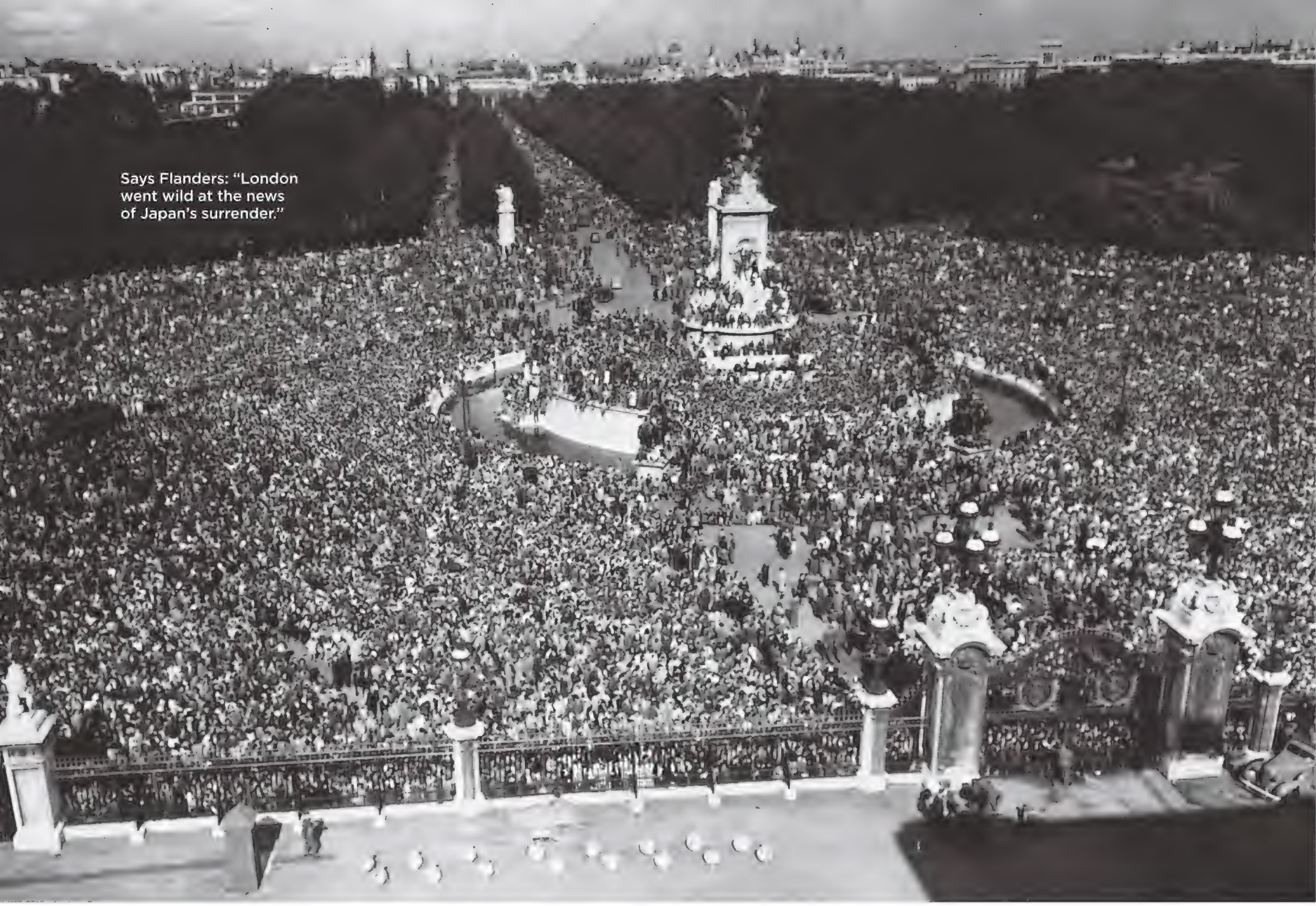
CARL WILKINS COLLECTION (2)

MY PARENTS had taken us from Queens, New York, for the second consecutive year, to Bain's, a small boardinghouse in the Middletown area of the Catskills. We spent my father's vacation there relaxing, reading, swimming and eating country cooking. I would be 10 in two months. I remember Mr. Bain decapitating the chickens we would eat for supper and singing the Rodgers and Hammerstein Broadway hit "If I Loved You" in a pleasant, unassuming baritone.

It was a quiet time, when I learned you could drink goat's milk right out of the goat. But one afternoon, as I was swinging in the old tire hung from the very tall tree on the sloped front lawn, some cars, maybe four or five in ten minutes, went by blowing their horns on the state highway before us. A couple of the drivers waved flags. And the afternoon quietly sank toward dinnertime.

Later, I told my parents about the cars and the flag-waving. They told me the war was over. At dinner, some of the guests mentioned it to each other, but there were no conversations about it. I think the adults I was with had been expecting the war to end soon. There was no celebration, only, it seems, quiet relief, and a willingness to put those fears into the past.

FRANCIS HENNINGER
CHESAPEAKE, VIRGINIA



Says Flanders: "London went wild at the news of Japan's surrender."

KEYSTONE / HULTON ARCHIVE / GETTY IMAGES; DENIS N. HUSTON COLLECTION

EUROPEAN THEATER

WITH APPROXIMATELY 70,000 other ex-combat troops from Germany, mostly riflemen, I was in one of the numerous "cigarette" camps, temporary tent cities, called Camp Lucky Strike, on the dry mud flats outside Le Havre, France. We were awaiting shipment to the States for a 30-day leave prior to invading Japan.

The weather was fine, the food was better than K rations, and German POWs did the chores. There was no mail in or out, no pay, no passes to Le Havre (too dangerous) and nothing to do each day, but nobody cared because it was a welcome relief from combat duty. We knew neither the day nor the month.

The daily routine consisted of waiting in line for two hours at the Red Cross tent to get two doughnuts and a cup of coffee. When the news came that the Japanese had surrendered after we dropped a superbomb, everybody was very happy, although a bit skeptical at first. It was hard to celebrate the occasion with two doughnuts and a cup of coffee.

DENIS N. HUSTON
OCEAN SHORES, WASHINGTON

I WAS IN LONDON when the war ended. A few days before, two atom bombs had been dropped on two Japanese cities. The word "atom" bomb was beyond our comprehension.

I happened to be on furlough at the time. We were waiting to be deployed to the Pacific Theater. I had spent several months in France and Germany prior to the German surrender.

London went wild at the news of the Japanese surrender. People poured into the streets. It seemed like everyone was singing and dancing. Riding down the street, standing in an open car, was Winston Churchill, flashing his famous "V for Victory" sign and puffing on his ever-present cigar. Three or four of us decided to leave Trafalgar Square and make our way over to Buckingham Palace. A huge throng had gathered outside the palace.

Every half hour or so, the royal family would come out onto the balcony. At that time, the royal family consisted of King George and Queen Elizabeth and their children, Princess Elizabeth and Princess Margaret. As they waved, a

deafening roar went up from the assembly below.

When all the celebrations had ended, we thought about our next happy occasion: landing on the shores of the good ole USA.

URBAN FLANDERS
CINCINNATI, OHIO

THE FOLLOWING is copied from a letter I wrote my fiancée (now my wife) on August 15, 1945, from Aschaffenburg, Germany:

My Dearest Briny Marlin,
The war is over. Peace is once again covering the world. However, I can't feel elated. I'm happy to know the day I will become a civilian again is coming soon, but I don't know whether I'll be coming home for a while. So please don't stop writing, and please don't expect me home for a few months at least.

Meanwhile, here is how we spent V-J Day:

First, it rained all day.

Second, we are all so interested in what will happen to our outfit that the news didn't cheer us much.

Third, two of our men are being punished and have walked around the athletic field all day carrying full field packs and rifles in the rain.

Fourth, I worked all day with the medical officer. I looked into 200 mouths and throats, checking for tonsillitis, etc.

I feel like a lot of fellows now that the job we had to do is done. We want to quit and come home soon to continue what we started before the war.

I had another letter from Mom today, so I hope mail will continue to come through. I'm still praying that God will let us come together SOON so we can enjoy a movie, cake, ride, swim, talk and log fire together. Maybe I could even talk you into one of those wonderful kisses you used to give me!!

Need I tell you –
I'll be loving you. Always.
Dick

RICHARD HAGERMAN
WENDELL, IDAHO

FOR ME, August 15, 1945, was the day my father returned from prison camp. It was the day when, for my family, World War II was finally over.

I was a 9-year-old boy living with my mother in a small town in the Bavarian Forest in Germany. We had moved in with my aunt after our house in Peenemünde had been destroyed in a 600-bomber air raid, which missed killing us by the narrowest of margins.

My father, a PhD in physics, had been one of the scientists who worked with Wernher von Braun on the German rocket project. Later, he rejoined von Braun's team as part of the U.S. space program and became a U.S. citizen.

In May 1945, a few days after our part of Germany had been overrun by U.S. forces, my father had been confined in an American internment camp. When he was released in August, he weighed only 95 pounds. He was thin and gray as a ghost. I barely recognized him as he came shuffling down our street, leaning on a stick, his clothes in tatters, the soles of his shoes patched with cardboard held together by twisted wire.

In the weeks before my father's return, I had heard newscasts on my aunt's radio of new and terrible bombs that had been dropped somewhere. But it meant very little to me. For me, the war was over because my dad, though sick and weak, had returned and our family was once again united.

WERNER H. HENGST
SOMERS, NEW YORK

I WAS ON MY WAY to Miami for redeployment to Japan. I'd been home on leave after a month's recovery from malnourishment and blood poisoning resulting from five months as a prisoner of war, captured during the Battle of the Bulge.

When I heard the news of the war ending, I was flooded with emotion. It would be so rewarding to be back on American soil, helping Mother run Dad's jewelry business. Dad had suffered a fatal heart attack while I was in England heading to my European Theater assignments. As a prisoner of war during the winter of 1945, I was forced to walk whole sections of Germany with my fellow Allied prisoners. My head had been shaved, as were most of the officers', to make us readily recognizable. The only clothes I had for the five frigid months were the ones on my back when I was captured. After liberation, I was sent to Camp Lucky Strike, in France, where the doctors pulled my infected thumbnail and gave me shots of penicillin for a week to combat the blood poisoning. My recuperating ex-POW buddies and I were fed an eggnog-type liquid to soothe our tender, malnourished stomachs until we could handle turkey soup and white bread.

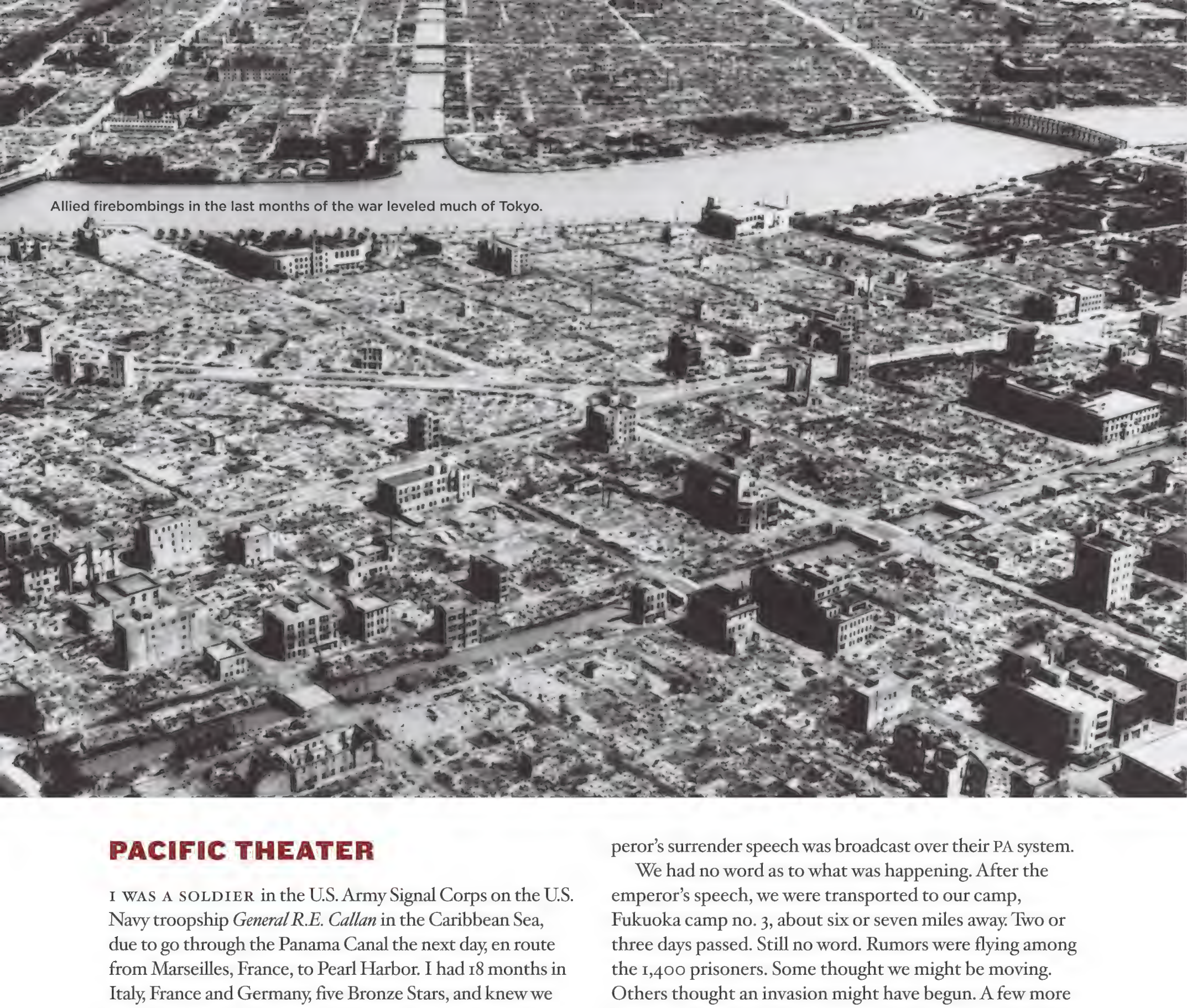
Upon arrival in America, we were each given a carton of milk; it tasted heavenly. It was so good to be home!

HAROLD NEHMER
CROSWELL, MICHIGAN

CLASS OF SERVICE
This is a full rate Telegram or Cable-gram unless its de-ferred character is in-dicated by a suitable symbol above or pre-ceding the address.
WESTERN UNION
A. N. WILLIAMS
SYMBOLS
DL Day Letter
NL Night Letter
LC Deferred Cable
NLT Cable Night Letter
WLT Week-End Letter
Ship Radiogram
Albert Nehmer.
Report just received through the International Red Cross
states that your son first Lieutenant Harold A.Nehmer
is a prisoner of war of the German Government Letter
of information follows from Provost Marshall General
J.A.Ulio The Adjutant

Nehmer: Five frigid months walking in one set of clothes.

HAROLD NEHMER COLLECTION



Allied firebombings in the last months of the war leveled much of Tokyo.

PACIFIC THEATER

I WAS A SOLDIER in the U.S. Army Signal Corps on the U.S. Navy troopship *General R.E. Callan* in the Caribbean Sea, due to go through the Panama Canal the next day, en route from Marseilles, France, to Pearl Harbor. I had 18 months in Italy, France and Germany, five Bronze Stars, and knew we were to go on the invasion of the home islands of Japan.

My feeling was one of surprise and relief and extreme thankfulness when I heard the war was over. I did not think that I had enough luck to survive the European war and then Japan also.

We cheered in elation and called for the *Callan* to fire her guns. "Wear them out, you don't need them now," which she did in salute.

HARRY E. HECKMAN
MCMECHEN, WEST VIRGINIA

I WAS ONE OF 203 MARINES imprisoned in North China on December 8, 1941, by the Japanese. I and several of my Marine colleagues were sent to Japan and put to work at the Yawata Steel Mill. On August 14, 1945, a company interpreter came to our shop and told us to "get our gear and line up." We were marched to an assembly area and loaded into open-gondola rail cars. We sat there until 12 noon, when the emperor's surrender speech was broadcast over their PA system.

We had no word as to what was happening. After the emperor's speech, we were transported to our camp, Fukuoka camp no. 3, about six or seven miles away. Two or three days passed. Still no word. Rumors were flying among the 1,400 prisoners. Some thought we might be moving. Others thought an invasion might have begun. A few more days passed, and the Japanese guards disappeared. I and my colleagues were cautiously optimistic.

After a couple more days, a fleet of B-25s flew over our camp. Then, a B-29 dropped barrels of food and clothing. Now we knew that we were going home, and each of our lives took on a higher sense of hope and feeling of blessedness.

MARION GUYNN
OCEANSIDE, CALIFORNIA

ON AUGUST 15, 1945, a Japanese officer entered my cell in a prison in Hokkaido and said, "Soon there will be peace. Soon you will be relieved [sic]." As the impact of the statement took hold, I had a vague feeling that my over three-month ordeal as an American POW of the Japanese might actually end with my going home, rather than my death.

I was a navigator/bombardier in the 11th Air Force, 77th Bomb Squadron, flying out of Attu in the North Pacific. We had been bombing factories and ships on Shumshu Is-

AP / WIDE WORLD PHOTOS

land and were captured after our B-25 crashed, May 19, 1945. Our entire crew of six survived, but three were later lost while being transferred by Japanese ship to Japan. The ship was torpedoed by an American sub.

The rest of us were moved from one prison to another, never knowing if we would survive the day. By the time we arrived in Hokkaido, we were ill, malnourished and feeling hopeless. The news of the end of the war dredged up the remaining ounces of hope in my benumbed mental state, but there was also some trepidation generated by rumors that we would all be shot before the liberating forces reached us. The reality was that our treatment improved to a degree, and we were allowed to bathe and shave. We were even taken into town, where we were given some money with which to buy what very little was available.

I firmly believe that this date marked a rebirth for me. Had the end of the war come much later, I am convinced I would not have survived to mark the event.

MILTON E. ZACK
LAGUNA WOODS, CALIFORNIA

AUGUST 15, 1945, dawned hot and humid in the Philippines. I was stationed at San Miguel North as part of the WAC [Women's Army Corps] group that was with General MacArthur's headquarters. We were cryptanalysts working on Japanese codes. Unfortunately, I had gotten "jungle rot" on my foot while in New Guinea. It had gotten so bad that I had to go to the hospital at Clark Field. About noon we heard loud voices in the next ward. Then a fellow came in our ward and shouted, "The war is over! The Japanese have surrendered!" There was silence as we thought about what we had heard. Of course, home was uppermost in our minds. Yet it didn't seem right to celebrate when so many of us wouldn't be going home. Our silence was in remembrance of our fellow soldiers, and in thankfulness to God that this terrible war was over.

MARY "GINNY" BLAKEMORE JOHNSTON
WINCHESTER, VIRGINIA

IN SPRING 1945, our family evacuated from Tokyo to Toyama, some 150 miles to the northwest. Two weeks later, another daily air raid, with incendiary bombs, turned the Ginza District, in downtown Tokyo, into piles of debris and dead bodies. That summer I turned 14.

Soon, the newspaper reported the total destruction of Hiroshima. The enemy had deployed a new type of bomb, an official report said. Rumors were that only one plane and one bomb had done the damage. Why so much destruction from a single bomb? Why was it not challenged by our fighters? We were doubly afraid.

Then Nagasaki was struck to the same horrible degree. Is this the end for us? Fear ruled. Then a notice went around: the emperor will address the nation over the radio at noon on August 15. Be sure to listen.

He spoke haltingly in an obscure, courtly way, but the message was obvious—the war was over, no more fighting. This meant that:
1. I no longer had to work in a factory,
2. I could go back to school full-time, and
3. We didn't have to shade the light any longer.

My school building had been destroyed. A dormitory for former factory workers served as a temporary facility. There was no heat or air conditioning.

The next several years were very bleak. Food and fuel were scarce. My father died from pneumonia in 1945. In 1947, I quit school and started working at a U.S. Naval Base in Yokosuka. I was the sole wage earner for a family of six. I returned to school, taking night classes from 6 p.m. to 10 p.m., Monday through Saturday.

In 1954, angels smiled on me, and I enrolled at the University of Oregon. I cannot thank enough the generosity of the late George and Edith Woodrich and the state of Oregon for four years of scholarship.

YASUO ISHIDA
ST. LOUIS, MISSOURI

DURING THE ENTIRE Japanese occupation of Korea (1910-1945), my father, who had been educated in America (Brown University, class of 1905), refused to learn to speak Japanese and to change our family name to a Japanese version, as every Korean was required to do.

But we children, born during the occupation, learned to speak Japanese fluently and did our best to behave like Japanese at our school, where we were taught entirely by Japanese instructors. Every morning at school assembly, the image of the Japanese emperor would be unveiled, and we would bow our heads deeply and recite our oath of allegiance in ancient Japanese.

Paik Zimmerman, age 8, in 1940.

As World War II was nearing its end, army recruiters insisted that even my brother, who was lying in a hospital with tuberculosis, enlist in the Japanese Army. At the first opportunity, Father hid my brother, me and our younger siblings in a mountain house near Seoul.

One lazy summer afternoon, my brother was listlessly picking out a tune at the piano half-listening to the radio. He suddenly stopped and motioned for us to come over. From the radio came a very faint voice speaking in archaic Japanese that we could hardly understand, like the emperor's decree we recited at school. Oh my, it was the emperor speaking. The emperor was telling us he could no longer bear the sufferings of his subjects and that the war was over.

Our parents and other grown-ups erupted in jubilation, while we children began to weep at the incredible fall of the Rising Sun.

UN-JIN PAIK ZIMMERMAN
BRYN MAWR, PENNSYLVANIA

UN-JIN PAIK ZIMMERMAN COLLECTION

I HAD BEEN STATIONED with the Navy in the Admiralty Islands for 15 months late in July 1945 when a buddy of mine and I met a B-29 pilot who was on his way home from Tinian, his airbase in the Mariana Islands. He excitedly told of the top-secret activity there. "The base was crawling with brass," he said. "It was something big involving B-29s that could end the war!"

He was right. The atomic bombing of Hiroshima and Nagasaki soon followed, signaling that the war was about to end. Within days, we met an enterprising airman who had returned from his home in Australia with a bottle of Haig and Haig Scotch he wished to sell for $35. Anticipating the war's end, we needed a potent drink to celebrate with, so despite its outrageous cost and that we both detested scotch, we eagerly accepted his offer.

On August 15, shouting and cheering roared throughout our entire base. Ships at anchor began blasting their horns. The war was over! Time to break out our scotch. That night, seated in the back of a GMC truck, we happily and endlessly toasted the war's end.

Several hours later, two big surprises awaited us. First, we found ourselves cold sober. Second, the realization hit us that we had been duped. Our high-priced scotch was nothing but a skillfully needled, highly watered-down version from Australia.

GENE MCDERMOTT
ALLENTOWN, PENNSYLVANIA

I WILL ALWAYS REMEMBER August 15, 1945. I was a gunner on a B-29 called "Dottie's Baby." I was stationed on Guam in a bombardment wing whose sole purpose was to bomb oil plants in Japan. All of our missions were at night.

August 6 and 9, atom bombs were dropped on Hiroshima and Nagasaki. The aircrews in our wing were excited because we hoped we would not have to fly any more missions. We thought the Japanese would surrender; they didn't.

August 14, we had to go again. This time we were going on the longest mission we had ever pulled: a refinery in northern Japan. (It took 12 to 14 hours to fly from Guam to Japan and back.) We got to our target sometime early in the morning of the 15th. We were at 12,000 feet and saw no Japanese fighters and very little flak. We dropped our bombs and left the target. Our number four engine quit. Our pilot said, "We are going to make an emergency landing at Iwo Jima." (A lot of B-29 crews were saved by being able to land on Iwo Jima; we can thank the Marines for that.)

As we were heading there, our navigator told us that he had heard a radio transmission from San Francisco. The Japanese had agreed to surrender unconditionally!

We landed at Iwo Jima August 15. We were told it was the last mission of World War II. We were very happy!

JOHN MOON
RENTON, WASHINGTON

I SERVED ABOARD the USS *Pennsylvania* from January 1942 to September 1946. This ship participated in amphibious operations from Attu to the Philippines and earned a Navy Unit Commendation for its action.

We heard rumors in early August 1945 that the Japanese Empire was near surrender, but we didn't have the slightest clue when this would occur. Much of the U.S. fleet was closing in on the Japanese mainland. On August 12, my ship, along with other warships and support vessels, was anchored in Buckner Bay, Okinawa, awaiting orders for the "Big Push." That night a lone Japanese torpedo plane hit and badly damaged our ship. Twenty officers and enlisted men lost their lives.

Wendler: Stuck waiting for the "Big Push."

When the ceasefire occurred on August 15, there was not much to celebrate, since the ship's crew was still occupied repairing the damage. Certainly, we were glad the war was over, but we had lost shipmates and mourned their passing. What made it doubly sad was that we had endured much action prior to the surrender without casualty to ship or crew. Yet less than three days before the ceasefire, a last-gasp effort by a lone warrior of the empire nailed us.

HENRY O. WENDLER
CORONA, CALIFORNIA

ON AUGUST 15, my ship was offshore Honshu, Japan's main island. The news of the emperor's surrender speech was gratefully received. We were also pleased that our new president, Harry Truman (from Missouri), thought the ideal place for the surrender ceremony was the battleship *Missouri*, my ship.

Toward the end of August, the *Missouri*, the British ship *King George V* and a number of other ships entered Sagami Wan, a large bay just south of Tokyo Bay. Tides pointed our anchored ships toward Mount Fuji, majestically rising in the distance. When the sun set behind Fuji, we played the "Star-Spangled Banner." It was one of the most moving moments of my life.

A few days before the September 2 surrender ceremony, we put into Tokyo Bay (all mine-swept) and anchored out. On the big day, our foredeck held the Allied leaders and Mr. Shigemitsu, for Japan. Afterward, squadrons of Navy planes came roaring over, at low level, followed by massed Air Force planes.

We knew the war was over! It was something not to be forgotten.

D. M. DE LANCEY
SAN MATEO, CALIFORNIA

HENRY O. WENDLER COLLECTION; P. 61 MAX DESFOR / AP / WIDE WORLD PHOTOS

Gen. Douglas MacArthur and other Allied leaders meet Japan's representatives, led by Foreign Minister Mamoru Shigemitsu, aboard the USS *Missouri* on September 2, 1945, in Tokyo Bay, for the surrender ceremony. Says De Lancey: "I was pleased Harry Truman thought the ideal place for the ceremony was my ship."

At the dawn of the British Bronze Age, a man experts call the Amesbury Archer (inset) journeyed from the Continent to the vicinity of Stonehenge (the massive Heel Stone marks the ancient road to the monument). To scholars, the discovery of the archer's grave was "dynamite."

Who was he and where did he come from? And what was his role in the making of the great monument? The discovery of a 4,300-year-old skeleton surrounded by intriguing artifacts has archaeologists abuzz

BY RICHARD STONE

MYSTERY MAN OF STONEHENGE

In the spring of 2002, archaeologists were nearly finished excavating the site of a planned housing development in Amesbury, a town in southwestern England. It had been a "routine excavation—bread and butter, as it were," says archaeologist Andrew Fitzpatrick, leader of the team from Wessex Archaeology conducting the dig. The team had uncovered a small Roman cemetery, a fairly common finding. Now all that was left to check out were two rough patches

of ground—"blobs," Fitzpatrick calls them—in a far corner of the site.

Early on that Friday in May, the crew went to work on the blobs with their trowels. By midmorning, they had determined that the blobs were graves. By lunchtime, they'd realized the graves predated the Roman cemetery by more than 2,500 years; in one, they uncovered the first of five clay funerary pots, having a "beaker" style associated with Britain's Bronze Age (2300-700 B.C.). Then a worker found "something shiny," as the crew leader reported that afternoon in a phone call to Fitzpatrick, who hurried to the site. The shiny "something" was a piece of gold.

Fitzpatrick ordered the workers to collect all the earth from the graves so that his staff back in the lab could sift through it and recover any fragments of relics or remains. With no way to hire guards for the site on the eve of a three-day holiday weekend, the team had to complete the job right away. After the sun went down, they illuminated the area with car headlights, finishing at 1:42 a.m. that Saturday. Later, when the sifting was done, 100 artifacts had been retrieved—the richest Bronze Age grave ever discovered in Britain.

There were two male skeletons, the most important of which was interred in a timber-lined grave on its left side, facing north. The legs were curled in a fetal position, common in Bronze Age burials. An eroded hole in the jawbone indicated that he'd had an abscess; a missing left kneecap was evidence that he'd sustained some horrific injury that'd left him with a heavy limp and an excruciating bone infection. A man between 35 and 45 years of age, he was buried with a black stone wrist guard on his forearm of the kind used to protect archers from the snap of a bowstring. Scattered across his lower body were 16 barbed flint arrowheads (the shafts to which they presumably had been attached had long since rotted away) and almost 100 other artifacts. The archaeologists started calling him the Amesbury Archer, and they assumed he had something to do with Stonehenge because the massive stone monument was just a few miles away. Because of his apparent wealth, the press soon dubbed him the "King of Stonehenge."

Begun about 3000 B.C., Stonehenge was built in stages over 1,400 years. The structure, whose purpose remains a mystery, started out as a huge earthen ditch with wooden posts and walls. The familiar 4-, 20- and 30-ton standing stones were erected between 2400 and 2200 B.C.—about the time the archer was buried nearby. Because radiocarbon dating has about a 200-year margin of error, however, not everyone is ready to call the archer a king. Mike Parker Pearson, archaeology professor at the University of Sheffield in England, points out that the archer may have come on the scene several decades after the stones were erected.

Andrew Fitzpatrick (below) and co-workers found a second male skeleton (opposite, being excavated by Kirsten Egging, left, and Jenny Keen) near the archer. Were the two related?

Compared with the glittering tomb of the Egyptian pharaoh Tutankhamun, who reigned some 1,000 years after the mysterious Stonehenge figure, the archer's possessions may not seem like much: in addition to the arrowheads and wrist guards, the grave held five pots, three tiny copper knives (one barely an inch long), a cache of flint- and metal-working tools, including a cushion stone—a hand-size piece of rock shaped like a sofa cushion that served as an anvil—and a clutch of boars' tusks. The grave also held a pair of gold hair ornaments—the earliest gold objects found in Britain. Other graves in the area, on the other hand, typically contain little more than a clay pot; by comparison, the archer died a very rich man indeed. "Most people would not have had the ability to take such wealth with them into their graves," says Mike Pitts, author of *Hengeworld*, who calls the find "dynamite."

The concepts of individual wealth and status were just taking root in Europe during the Bronze Age, when most trade was still conducted by barter. The preceding Stone Age is marked by what appears to have been relative economic equality, with no grave appreciably richer than any other. Archaeologists long thought this egalitarianism extended into the Bronze Age. The Amesbury Archer has overturned that idea.

The archer's mourners had undoubtedly wished him well, says Fitzpatrick. But what did his grave goods signify? Did his stone wrist guard mean that he was an archer in life, or was it conferred on him posthumously to honor his high status? Were the bow and arrows intended to help him hunt, or to protect him in the next world? Nobody knows. "How the archer acquired his wealth and what it signified are questions that are impossible to answer," Pitts says.

But forensic archaeology has revealed some telling details. One of the most sensational came straight from the archer's mouth. To scientists, a person's tooth enamel is like a GPS for pinpointing his childhood home. The main ingredient of tooth enamel, apatite, is composed of calcium, phosphorous, oxygen and other elements. The composition of the oxygen molecules in apatite depends on the water a person drank as a child, and that, in turn, can reveal a great deal about where

RICHARD STONE, the author of Mammoth: The Resurrection of an Ice Age Giant, *is an editor at* Science *magazine.*

BOB BARKANY / GETTY IMAGES; PP. 62, 63 SION TOUHIA / GETTY IMAGES; P. 63 GREG HARLIN / WOOD RONSAVILLE HARLIN; P. 65 WESSEX ARCHAEOLOGY

he grew up—from the temperature of rain or snow to the distance from a coast and the area's altitude. Using a laser scan to determine the makeup of the oxygen in the archer's tooth enamel, a team at the British Geological Survey led by geoscientist Carolyn Chenery concluded that he grew up in a cool region of Central Europe, most likely somewhere close to the Alps or present-day southern Germany.

The notion that he hailed from the Continent has far-reaching implications. For decades, scientists believed that beaker pottery, like the pots found in the archer's grave, was brought by invaders across continental Europe to the British Isles. But most archaeologists now say the pottery—and the knowledge needed to create it—diffused peacefully, through trade or through travelers who were skilled craftsmen.

A more significant imported skill was metalworking. Around 2300 B.C., the stone tools and weapons that had defined Britain's Stone Age were being replaced with metal implements. The Bronze Age varies from culture to culture, but it is thought to have started in southeastern Europe about 4000 B.C. and then spread westward across the Continent before reaching Britain 4,000 years ago. The archer would have been at the vanguard of the flashy new trade, which sometimes produced items just for show: Fitzpatrick says the archer's copper knives, for instance, which are too soft to have been used primarily as weapons, were probably for display or eating. (It would take at least another century after the archer's arrival before the technology of alloying copper and tin to make sturdier implements reached Britain.)

The evidence that the archer not only carried metal but knew how to work it comes mainly from the cushion stones found in his grave. Researchers say it is unlikely that such a tool would have been buried with anyone but its owner. (Carbon dating, and the absence of metal objects from earlier graves, suggest the archer's arrival roughly coincides with the arrival of metalworking to the British Isles.)

The archer's skill would have allowed him to move freely from community to community. "The knowledge in his hands and in his head," Fitzpatrick says, "was the key to his status. He brought a unique or exceptionally rare skill. You can think of the archer as a kind of magician. You can revere metalworkers, but you can also fear them."

Arriving 4,300 years ago in an area we now call Wiltshire, the archer would have likely encountered a rural setting of round timber houses with conical thatched roofs. (Today, Amesbury center is graced by red brick and pastel-colored stucco buildings, and enterprises beyond the archer's wildest fantasies: Amesbury Tandoori, for example, and Hair by Joanna.) Of course, the lure of Wiltshire then, as now, was Stonehenge. Speculation about its purpose has centered on the notion that the monument was built in part to capture the rays of the rising sun during the summer solstice, the longest day of the year. A new idea is that Stonehenge was about the winter solstice, or the shortest day of the year. "Stonehenge has been looked at the wrong way around," says Parker Pearson, one of the winter theory's proponents. In the past year, archaeologists have reanalyzed material excavated in the 1960s from a nearby monument built about the same time as Stonehenge. Pig remains from wooden structures found within this henge, called Durrington Walls, show that feasting rituals went on in the winter.

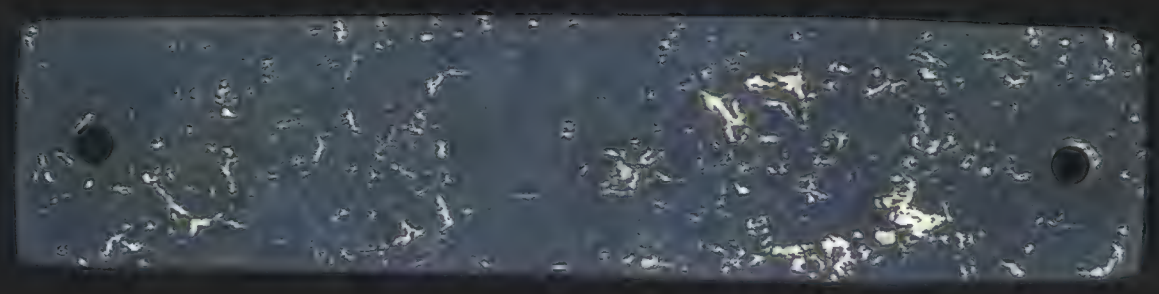
Work on Stonehenge began around 3000 B.C., with a ditch circling wood posts (1, 2). Six-foot-tall stones went up 600 years later (3). Circa 2300 B.C., when the archer arrived, 30-ton stones appeared—the arrangement of the ruin we know today (4).

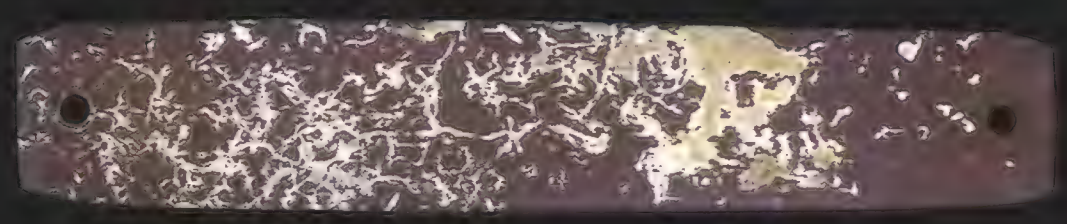
"What is happening around that time is a tremendous religious revival," says Parker Pearson. "We're dealing with more sophisticated societies than we give them credit for. Stonehenge was built for the ancestors whose funerary rites were held at Durrington Walls and along the river to Stonehenge, with the festival of the dead celebrated at midwinter."

It is unlikely the archer set off from the Alps expressly to see Wiltshire's massive structures, though Fitzpatrick says there may have been whisperings on the Continent about their existence. But about the same time he arrived, "something utterly unprecedented, unique in scale and vision took place," says Pitts: the erection of the 20- and 30-ton stones. Most archaeologists believe the massive stones were hauled to the monument's location on the Salisbury Plain from the Marlborough Downs, 20 miles to the north—a colossal distance for a society without wheels.

And it's even possible the archer may have provided the catalyst to get the project started. "He could have brought with him the stock of imagination to conceive of something quite extraordinary," Pitts says. Perhaps he exploited his position as a charismatic outsider, unsullied by local politics or infighting, to forge alliances among the region's chieftains. "Building Stonehenge might seem an absolutely crazy thing to do," says Fitzpatrick. Yet "involving lots of people in a construction project is a way of bringing people together—creating and seizing status."

DOUG STERN (4); P. 67 ELAINE WAKEFIELD / WESSEX ARCHAEOLOGY





The richest Bronze Age discovery in Britain, the archer's grave yielded artifacts that attest to his unusual skills and high status. Two stone wrist guards (right) and 16 flint arrowheads (detail above left) indicate proficiency with a bow. Two inch-long gold hair clasps (below) are the earliest gold objects ever found in Britain. The abundance of grave goods (above right, a reconstructed beaker pot) has stunned archaeologists. Was the archer really the "King of Stonehenge"? They don't really know. But he *was* important. "Most people would not have had the ability to take such wealth with them into their graves," says Mike Pitts.

Return to

A veteran Vietnam correspondent revisits the romantic retreat where he, and so many others, sought respite from war in Indochina

BY STANLEY KARNOW
PHOTOGRAPHS BY CATHERINE KARNOW

I OFTEN SEARCH for traces of nostalgia while traveling abroad, on the theory that delving into the past helps one understand the present. Particularly in Asia, long my turf as a newspaper correspondent, I'm intrigued by vestiges of the influence exerted by Western powers on their empires. I've journeyed to Darjeeling and Simla, hill stations nestled in the shadows of the Himalayas, to poke into the relics of airy bungalows where the British sahibs who ruled India ensconced themselves to escape the ferocious monsoon heat and humidity of New Delhi or Calcutta. I've visited Baguio, the mountain retreat that served Americans residing in the Philippines as a haven from suffocating Manila, and I've been to Bandung, constructed by the Dutch in the Javanese highland to flee

Set on a forested plateau 5,000 feet above sea level, the resort town (looking out on Xuan Huong Lake) retains, says the author, "much of its old-fashioned charm."

Da Lat

the stifling months in Jakarta. When I was reporting on the Vietnam War for *Time*, the *Washington Post* and NBC News, as a respite from the relentless sweat, grime and danger of my assignment, I occasionally flew up to Da Lat, the resort that the French carved out of a misty, pine-covered plateau about 200 miles northeast of Saigon, now Ho Chi Minh City. Apart from a brief clash in 1968, the retreat was hardly affected by the fighting, since by tacit agreement both sides conveniently used it for rest and recreation. I recently returned there and found that Da Lat still retains much of its old-fashioned charm, even though modernizing trends are rapidly changing the attitudes of at least some of its inhabitants.

Rising to roughly 5,000 feet above sea level, the plateau was sparsely populated by hill tribes when, in 1893, Alexandre Yersin, a Swiss-born scientist with a taste for adventure, trekked into the region. (Yersin, who had conducted research at the Pasteur Institute in Paris, later went on to China, where he discovered the bubonic plague bacillus, then ravaging Asia and threatening the West.) The pristine beauty and salubrious weather so impressed Yersin that he persuaded the French colonial administration to develop the locale into a vacation spot. According to some accounts, an anonymous bureaucrat baptized it Da Lat, meaning roughly "the water source of the Lat people." Then, someone with a classical education created an advertising slogan, an acronym constructed from the first letters of the Latin phrase *dat aliis laetitiam aliis temperiem*—"offering happiness for some, a comfortable climate for others."

Top tourist draws include a sprawling indoor market (opposite) and the sumptuous Palace hotel (below), a 1920s landmark once frequented by Noel Coward and Somerset Maugham.

Initially, the isolated area attracted only a handful of tea planters and hunters in quest of deer, elephants, wild oxen and boar. The vertiginous ascent from Saigon over a single rutted dirt road by car could take as much as a week; the only lodging was a rudimentary *auberge*. But French officials, optimistically calculating that a luxury hotel would beckon an affluent clientele, erected the sumptuous Palace, opened in 1922. A deluxe suite was 22 *piastres* a night, roughly $200 today. Da Lat's distinguished guests included kings, maharajahs, princes, politicians, Noel Coward and Somerset Maugham, whose novels and short stories vividly describe the European expatriate experience in Asia.

Imagining how they might have spent their days, I envisioned guests setting out on leisurely nature walks, riding horseback along forest trails or golfing on a course designed to amuse the adolescent Vietnamese emperor, Bao Dai, whom the French controlled as their puppet. In the evenings, the men dressed in black tie, their wives, or mistresses, in frilly gowns. They gossiped over aperitifs on the wide veranda and, after lavish dinners, played bridge in one of the salons or baccarat at the casino. There were piano or violin recitals and an orchestra for dances. A nearby bordello employed exquisite French, Vietnamese and Chinese prostitutes. But the resort, clobbered by the Depression in the 1930s, floundered; travelers found the hotel as empty as a mausoleum. On my visits during the Vietnam War, the Palace functioned but had virtually no guests.

The Communists expropriated the resort following their victory in 1975, but lacked the skills or the inclination to run it. Besides, they abhorred it, or so they said, as a memento of "heinous imperialism." Eventually Larry Hillblom, the founder of DHL, the global courier, bought it in a joint venture with the Vietnamese provincial government; Hillblom invested a fortune in its renovation. An eccentric Californian, he roamed Asia in T-shirts, shorts and sandals, fathering several illegitimate children by young women. He died at age 52 when his private plane crashed into the Pacific in 1995. Attorneys representing the four children—their paternity confirmed by DNA testing—induced the courts to award each $50 million or so from his stupendous estate.

The daily flight from Ho Chi Minh City is frequently delayed or even canceled. But I arrived on schedule and checked into the meticulously remodeled hotel, now the Sofitel Dalat Palace, whose amiable manager welcomed me with a flute of champagne.

Majestically perched on a crest overlooking placid Xuan Huong Lake, the Palace commands a vista of verdant landscape. Evoking the hotel's vanished past, a black 1955 Citroen sits in the driveway. The walls of carpeted corridors are hung with a hodgepodge of reproduction medieval tapestries and facsimiles of Cézannes, Dufy aquarelles, Renoirs, Manets, Matisses and Monets, turned out by an assembly line of talented Vietnamese copyists. Miniature bronze sculptures of nymphs and satyrs flank faux-antique porcelains.

Hiring a taxi, I ventured out to explore the town, where

STANLEY KARNOW, based near Washington, D.C., is the author of Vietnam: A History. *He produced this story in collaboration with his daughter, photographer CATHERINE KARNOW.*

parks and broad avenues are shaded by acacias, cedars, palms and mimosas. Jasmine, liana, hibiscus hedges and fragrant frangipani encircle pastel stucco, half-timbered French villas with wrought-iron balconies, brick chimneys, sloping ceramic-tile roofs and curved eaves—an incongruous though handsome hybrid of Oriental and Gallic styles sardonically dubbed "Norman pagoda." The spire of a Romanesque Catholic cathedral looms over Buddhist temples; a secluded cemetery entangled in weeds and moss contains the neglected tombs of Dominican, Franciscan and Jesuit missionaries who came here to preach the Gospel. A further vestige of French influence is a roughly one-quarter-size replica of the Eiffel Tower.

I was struck by the carnival mood—an indication perhaps that the Vietnamese are striving to forget the horrendous war. Parents and children crowd confectionery shops, ordering up milkshakes and ice-cream sundaes. I sauntered through a square where ersatz cowboys in ten-gallon hats steered toddlers around on ponies while a troupe of clowns, costumed as buffaloes, gorillas, zebras and lions, staged pantomimes. At the Valley of Love, an amusement park on the outskirts of town, honeymooners self-consciously posed for photographs under bowers of roses.

The railway to Da Lat has been defunct for decades, but the station, a dubious Art Deco effort reaching back to 1938, serves as the terminal for a dinky train and dilapidated locomotive that puffs around its tracks for 15 minutes, bells clanging and whistles shrieking. When I appeared for an excursion, a conductor in a starched uniform embellished with braided epaulets courteously apologized that it was broken and being repaired—as a mechanic divulged to me it chronically is.

In 1981, on my first trip back after the war, Vietnam was deeply mired in poverty and on the verge of collapse, partly as a result of the devastation left by the conflict and also because of the regime's Marxist economic policies, which forbade any hint of capitalism. Peasants were compelled to deliver their crops to the state; agricultural output fell drastically. Merchants were subjected to onerous regulations; they defiantly closed their stores, and trade declined. But a coalition of moderate politicians, alarmed by deteriorating economic conditions, has promoted a measure of free enterprise: today, Da Lat's thriving outdoor market reflects a new prosperity.

A maze of arcades spills into adjacent alleys, thronged with gamblers, beggars, pickpockets, hustlers and peddlers. Elderly women and young girls clad in conic rattan hats and traditional *ao dais*—billowing pantaloons and long loose tunics slit to the waist—squat behind baskets, offering azaleas, chrysanthemums, geraniums, gladiolas and peonies brought in from suburban flower farms. Huge crates overflow with a dazzling array of fruit and vegetables: avocados, bananas, coconuts, durians, litchis, melons, asparagus, chilies, mustard greens, yams, tomatoes and water chestnuts.

Apothecaries carefully weigh out traditional remedies and elixirs by the ounce—powdered stag antlers, rhinoceros horns, ginseng. Sidling through the packed aisles, I observed scores of spices and herbs, ranging from basil, cardamom, cloves and coriander to sage, sesame, star anise and saffron. Fishmongers hover over bins of fresh-caught shrimp, squid, clams, oysters, crabs, tortoises, bass, perch and tuna. Cages of squawking chickens, geese and pigeons dangle from crampons above counters piled with slabs of pork, beef and veal.

Other stands, catering to the superstitious, are heaped with mysterious amulets, talismans, fetishes and astrological charts. The clothing section bulges with a jumble of knockoff Levi jeans, ensembles bearing Bill Blass logos, Adidas athletic shoes and denim jackets emblazoned with Harvard, Princeton or Stanford insignia—all manufactured in Vietnam or smuggled in from China, Taiwan, Thailand and South Korea. I had expected to see native handicrafts, but cubicles are crammed with cheap plastic toys, New York Yankees baseball caps, Mickey Mouse wristwatches, Madonna mugs, fake Zippo cigarette lighters engraved with the emblems of U.S. Army regiments, and souvenir banners inscribed with mawkish mottoes in English—"Regards to my Mother from Dalat."

Da Lat (in Vietnam's central highlands) remained relatively tranquil, even during the war.

GUIDEBOOKS publicize the mansion where the country's last emperor, Bao Dai, dallied with his favorite concubine until he was exiled to the Côte d'Azur in 1955 after the South Vietnamese republic, with help from the CIA, deposed him in a blatantly rigged election. I anticipated regal magnificence, knowing that the French had spared no extravagance to gratify his whims. But except for the lush gardens abounding in orchids, bougainvillea, dahlias and magnolias, I found the residence prosaic. The furniture resembles conventional Sears. Shelves cluttered with gifts from foreign dignitaries display a routine collection of gold plates, jewel-hilted sabers and commemorative medals.

Not far from the royal mansion lies a mildewed cottage concealed in a bamboo grove; here, at the quirkily named Stop and Go Café, writers and artists gather to swap ideas and discuss works in progress. The proprietor, Duy Viet, cordially introduced me to his comrades who, presumably em-

MIKE REAGAN

At the Stop and Go Café, gathering place for a beret-clad, presumably Parisian-influenced bohemian set, a serving of scalding artichoke tea, the author notes, "calms the nerves."

ulating Montparnasse boulevardiers, sport berets and scarves and wear their hair down to the shoulders. Sprawled across a sofa or seated on benches, they smoked Marlboros and sipped goblets of scalding artichoke tea, which reputedly calms the nerves. While Duy Viet strummed a guitar and crooned folk songs in a nasal twang, a poet recited in French an elegy dedicated to a deceased friend:

He reposes as he lived,
Alone, absolutely alone.

By contrast, another nearby studio seemed to thrive not on tranquillity but bedlam. Located on a dusty lane behind a tumbledown pagoda, it belongs to Vien Thuc, a Zen Buddhist priest. Attired in a coarse brown robe and cowl, he revels in his perhaps self-imposed sobriquet, "the mad monk." No sooner did I step over his threshold than he grabbed a brush, dipped it into an ink pot and dashed off a haiku in ancient Vietnamese calligraphy on a paper scroll. "My inspiration is Van Gogh," he proclaimed, charging around frantically and muttering, as he pointed to the dozens of sketches portraying his muse, full face and profile, with and without the ear.

The Han Nga Guesthouse and Art Gallery, named for its proprietress, Dang Viet Nga, is also called the "Crazy House." It embodies a fusion of Surrealism and Dada gone berserk. The gate is guarded by two mammoth concrete giraffe sculptures, their necks interlocked to form an arch; the stomach of one constitutes a snack bar that dispenses cold Coke and Pepsi. Soaring above the patio is a giant concrete banyan tree, its twisted roots extended like slithering tentacles. An almost invisible filigree of wire spider webs is suspended from the branches. Tape-recorded calls of frogs croaking, monkeys chattering and birds twittering are piped through a loudspeaker, devised to foster the illusion of a bucolic setting.

The bizarre spectacle seemed amusingly zany until Madame Nga proposed that I inspect some of her ten rooms, supposedly representing various fauna and flora. Climbing a spiral staircase, we squeezed through narrow ramps to an aerie whose centerpiece is a gargantuan sculpted eagle, wings spread, talons bared, beak open. I also peered into the Kangaroo, Termite and Tiger rooms. In the subterranean Ant Room, swarms of slimy Bakelite insects infest a tree stump.

A petite woman in her 60s, Nga invited me into her parlor, offering cups of the inevitable artichoke tea. After studying architecture in Moscow during the 1960s, she rejected Soviet design orthodoxy and moved to Da Lat in hopes of establishing an experimental installation. "What I have achieved here," she told me, "encapsulates the intimate relationship between humankind and nature." I was astounded that the Communist Party, which rigorously insists on "so-

From his studio in town, Vien Thuc, calligrapher, artist and Zen Buddhist monk, claims "My inspiration is Van Gogh." Da Lat's still rural outskirts (below) contain extensive flower farms.

cialist realism," had authorized her weird project. But I understood why the minute I saw that the portraits on her walls depicted her father, Truong Chinh, who followed Ho Chi Minh as Vietnam's president. Until his death in 1988, he had been one of the most sectarian Communist bosses. Clearly he had obtained the approval she needed—proof that in Vietnam, as elsewhere, kinship transcends ideology.

ONE MORNING I drove into the countryside. Peasants labored in paddy fields, protected at intervals by gleaming white statues of Phat Ba Quan Am, a Buddhist goddess of compassion. I stopped at a flower farm, where the owner, in his mid-40s, identified himself as Le Mai Xuan. As we strolled around the meticulous, one-acre plot, he told me that he cultivates chrysanthemums that wholesale for 7 or 8 cents each. He moonlights as a policeman. His wife, Thuy, is a teacher; together they earn $14,000 annually—a staggering sum compared with the Vietnamese average of about $500. Despite their wealth, however, they and their three children share a minuscule house with outdoor plumbing. The family cooks on a primitive charcoal stove, but they have a radio, television set, videocassette recorder and refrigerator. Their teenage son Hung sat at a makeshift desk in a corner, learning English on a computer. Logging onto the Internet, he demonstrated a vocabulary lesson, repeating the words on the monitor: "Bob and Jane are staying with their Uncle George in Pittsburgh." Beaming with pride, his father told me, "My dream is that he becomes an engineer, a doctor or a lawyer, and cares for me when I retire." I wished the youngster good luck.

These days, cruise ships unload hordes of tourists carrying cameras and camcorders to visit beautiful sites such as Hue, Hanoi and Ha Long Bay. But Da Lat is too distant from the coast to be inundated by day-trippers. So the happy prospect is that its capricious, anachronistic atmosphere will endure as a reminder of its distinctive history.

For more on Stanley Karnow's Da Lat trip, go to www.smithsonianmag.com.

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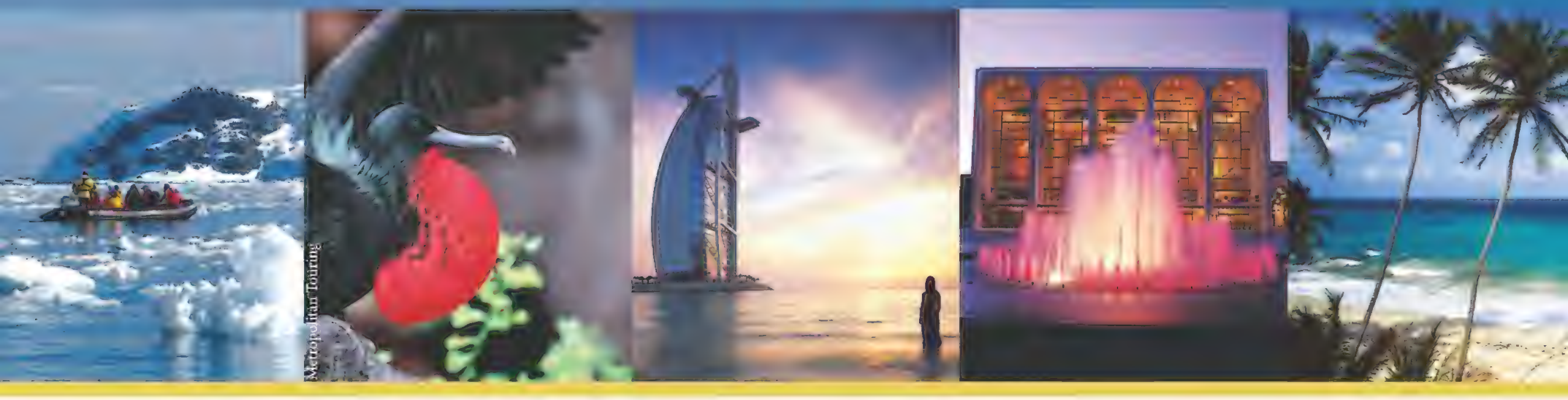

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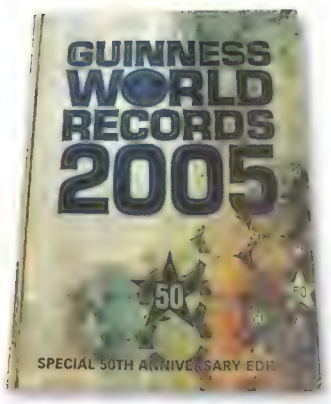
WORLD'S TALLEST MAN

Robert Pershing Wadlow (in 1938, at age 20, with actresses Maureen O'Sullivan, left, and Ann Morris) had risen to a record height of 8 feet 11.1 inches by the time of his death in 1940.

BETTMANN / CORBIS

WORLD'S UNLIKELIEST BESTSELLER

Fifty years ago a brewer's bet spawned a compelling compendium of feats, stunts and trivia **BY BRUCE WATSON**



RECORD BOOKS note that the first man to break the four-minute mile was England's Roger Bannister. The same books list the current world record in the mile as 3:43.13 (Hicham El Guerrouj, July 7, 1999). Yet no world-class miler has ever faced the hurdle that Ashrita Furman confronted last summer at New York's John F. Kennedy Airport.

"It's a very tough record, even though it's a silly event," Furman says on a warm August morning as passengers hurry through the concourse of JFK's Terminal 4. Furman, a 49-year-old health food store manager from Queens, is about to attempt his own world-record mile. The time to beat (29 minutes) seems like a snail's pace, except for one minor detail. For the entire mile Furman must push an orange . . . with his nose.

At first, Furman, who has set dozens of other world records, including Most Jumping Jacks (27,000 in 1979; 33,000 in 1982) and Longest Time Yodeling (27 hours), had no interest in the event. "But it was broken a couple of times," he says, "and is now down to 29 minutes. So it's a challenge."

The Orange Nose Push does not begin with a starting gun. Furman merely sets an orange—hard and green for better rolling—on the terminal's tiled floor, kneels over it, and with a great "oomph!" shoves it with his sizable snout. The race is on. The orange rolls 30 feet. Furman jogs after it, crouches again, shoves. Passengers smile warily. Then a guard halts cross traffic. "Stand back!" he warns. "This guy's doing a Guinness record." And suddenly everyone understands. Guinness, a name that used to stand only for frothy dark beer, is now known the world over for zany world records.

This year the Guinness book celebrates its 50th anniversary. Since 1955, the company's exacting scribes have chroni-

FASTEST ORANGE NOSE PUSH

"I do it for the challenge," says Ashrita Furman (nosing a green orange down the concourse of Terminal 4 at New York's JFK on August 12, 2004, in record time—24:36 for the mile).

SHANNON STAPLETON / REUTERS / CORBIS

FASTEST FISH: COSMOPOLITAN SAILFISH **LARGEST ACTIVE VOLCANO:** MAUNA LOA, HAWAII **LONGEST SALAMI:** 498 FEET 3.6 INCHES **LARGEST ANIMAL BRAIN:** SPERM WHALE

LARGEST HUMAN RAINBOW

On September 18, 2004, 31,000 students, faculty, staff and alumni of the Polytechnic University of the Philippines formed a human rainbow in Manila.

cled the earth's extremes: Tallest Building (Taipei Financial Building, Taiwan). Largest Atoll (Kwajalein in the Marshall Islands). Driest Place (Chile's Atacama Desert). Heaviest Human (Jon Brower, Minnoch, U.S.A., 1,399 pounds). Most Venomous Mollusk (the blue-ringed octopus). Now it also sanctions some of the world's silliest stunts. Most Clothespins Clipped on a Face (159). Most Straws Stuffed in the Mouth (258). Largest Group Hug (5,117 people). The list goes on, making each annual Guinness edition a compendium of timeless trivia, genuine feats and shameless publicity stunts. And readers around the world have made it a record setter in its own right. Under bestselling books, the 2005 golden anniversary edition states: "Excluding noncopyright works such as the Bible and the Koran, the world's all-time best-selling book is *Guinness World Records*," with sales exceeding 100 million copies.

Charting the world's superlatives is painstaking work. Whether it's the largest galaxy or the lightest subatomic particle, the single clearinghouse for all Guinness records is an eighth-floor suite of offices in an ultramodern glass building on Euston Road in central London. Here nine full-time researchers monitor current records, witness new attempts and handle 60,000 inquiries a year from would-be record setters, more than half from the United States.

Getting the "ests" from the "ists": The McWhirter twins (Norris, left, and Ross, age 27 in 1953) put together the first Guinness book in 1955 in just 16 weeks.

Only 15 percent of all new proposed attempts get the Guinness go-ahead. Many are too specific. Most People Crammed into a '63 Chevy? Sorry, but Guinness accepts car-cramming records only for "iconic" cars such as the Volkswagen Beetle. Oldest Pit Bull? Guinness does not categorize pet records by breed. "People often try to claim a record by complicating it," says Guinness' Keeper of the Records, Stewart "The Oracle" Newport: "They'll say they have the record for Longest Standing on the Corner of Such and Such a Street While Playing a Banjo."

Each workday morning, Guinness researcher Hein Le Roux, a former jour-

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Frequent contributor BRUCE WATSON *is the author of* Bread and Roses: Mills, Migrants and the Struggle for the American Dream.

MIKE ALQUINTO / EPA / SIPA; HULTON ARCHIVE / GETTY IMAGES; P. 79 WILL KINCAID / AP / WIDE WORLD PHOTOS

MOST SNOW ANGELS

In March 2002, 1,791 souls winged it on the State Capitol mall in Bismarck, North Dakota, to create a record number of snow angels.

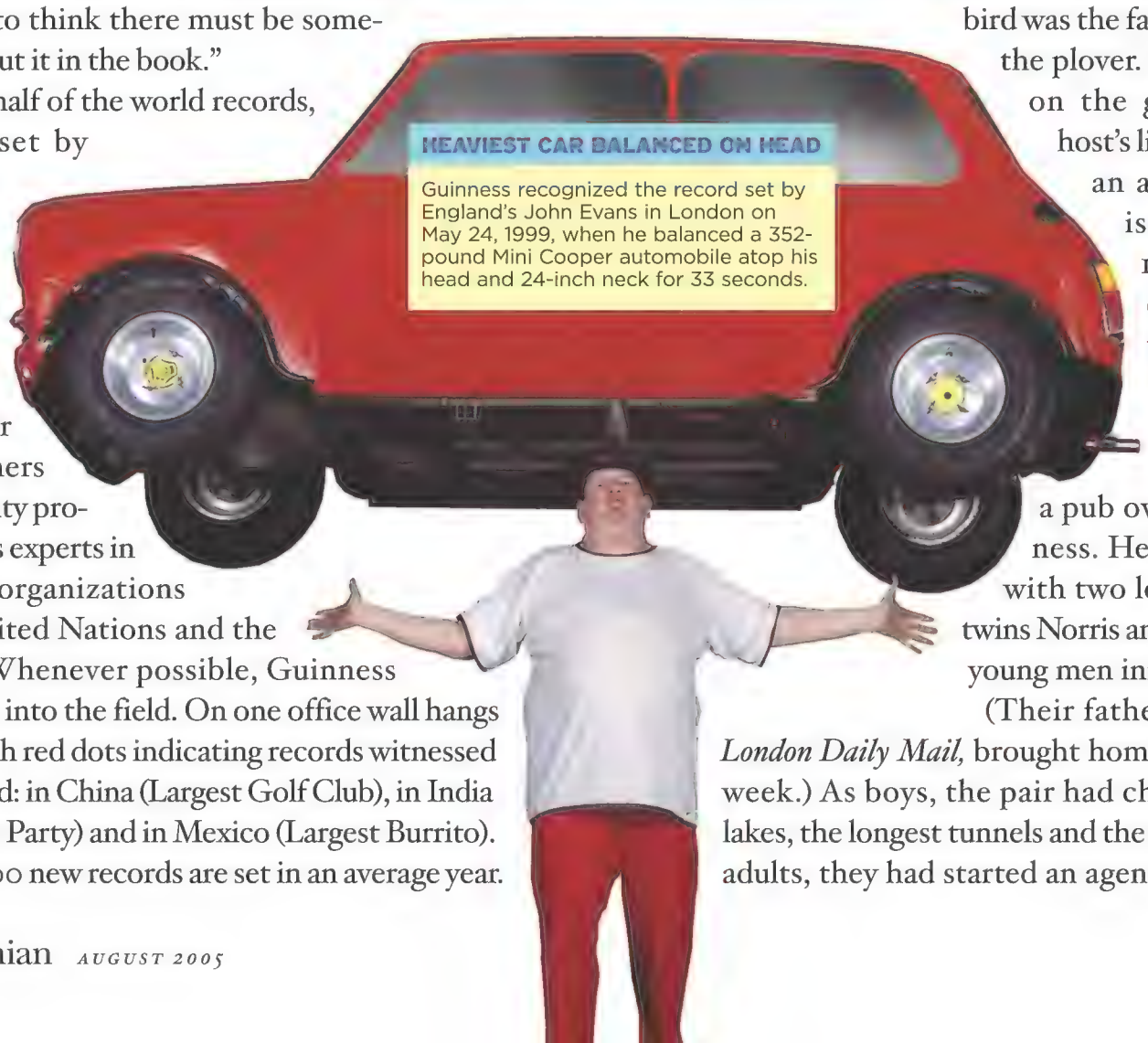
nalist from South Africa, reviews his most recent inquiries. From Nigeria: "My daughter has traveled so many times with me by air and road since she was six-weeks old. . . . " Most Traveled Child? Not "Guinnessy," says the 30-year-old Le Roux. From Texas, a proposal for the largest motorcycle parade. A possibility, but since there is no existing record, he sets a minimum of 10,000 cycles.

All sanctioned attempts must meet Guinness' rigorous guidelines. Endurance artists attempting the Longest Tuba Marathon or Longest Ironing Marathon are given breaks every hour or every eight hours, depending on the length of their ordeals. Gluttons are instructed to eat the most meatballs, etc., within one-, three- or five-minute periods. Karate experts must break the same-sized brick. And each record attempt requires two witnesses and press coverage. If rules are violated, no record, no matter how amazing, can be certified. Guinness once revoked the achievement of a man who swam 1,864 miles along the Missouri and Mississippi rivers because he wore swim fins.

Even if all criteria are met and an existing record is broken, there is no guarantee that it will make the book; lest the annual edition run to 3,000 pages, only about 10 percent get into print. Guinness editor Craig Glenday favors records that are unique, interesting and appeal to a wide audience. "When we realize there are all sorts of people vying for a record," he says, "we start to think there must be something in it and put it in the book."

"We endeavor to keep our ears and eyes in all fields," says the Keeper of the Records, Stewart "The Oracle" Newport.

Only about half of the world records, however, are set by humans. To keep abreast of achievements in science, politics, nature and dozens of other fields, researchers consult university professors as well as experts in various global organizations such as the United Nations and the World Bank. Whenever possible, Guinness staffers are sent into the field. On one office wall hangs a world map with red dots indicating records witnessed around the world: in China (Largest Golf Club), in India (Longest Dance Party) and in Mexico (Largest Burrito). In all, some 3,000 new records are set in an average year.



HEAVIEST CAR BALANCED ON HEAD

Guinness recognized the record set by England's John Evans in London on May 24, 1999, when he balanced a 352-pound Mini Cooper automobile atop his head and 24-inch neck for 33 seconds.

THOMAS WAGNER / REDUX; DREW GARDNER / GUINNESS WORLD RECORDS

AS HE GRUNTS DOWN the JFK concourse, Ashrita Furman keeps his eyes on the orange. "Almost a minute ahead of schedule!" an assistant calls out as Furman heads for his second lap. He gasps for air. He crouches more slowly, aims more deliberately.

Although he has never attempted a record nosing an orange through an airport before, Furman is hardly a stranger to Guinness staffers, who know him as "Mr. Versatility." Since 1979, when he did those numbing 27,000 jumping jacks, he has set numerous records. In Paris, he did 8,555 abdominal crunches. In Indonesia, he jumped rope for two hours. He's carried a nine-pound brick 85 miles, and he's somersaulted a dozen miles along the path of Paul Revere's famous ride. Why? "I do it for the challenge, the fun and the spiritual transcendence of pushing myself further," Furman says. He has set no fewer than 93 official Guinness Word Records, itself a record. "To push yourself," he reflects, "to be better, to be the best—it's something instinctive in human beings."

In the world according to Guinness, superlatives have existed since the big bang—the Universe's Greatest Explosion. But it took a brewer and a bet to turn them into literature. One day in 1951, Sir Hugh Beaver, managing director of the Guinness brewery in London, was hunting game birds at an estate in Ireland when a spirited debate broke out. Which bird was the fastest? Sir Hugh said the plover. Fellow hunters bet on the grouse. But their host's library failed to yield an answer. When the issue arose again in 1954, Sir Hugh decided there ought to be a book to settle such disputes, especially any that might break out in a pub over a pint of Guinness. He then got in touch with two local sportswriters, twins Norris and Ross McWhirter, young men infatuated with facts. (Their father, an editor at the *London Daily Mail,* brought home 150 newspapers a week.) As boys, the pair had charted the deepest lakes, the longest tunnels and the tallest buildings. As adults, they had started an agency to supply sports

trivia to British newspapers. Accepting Sir Hugh's challenge, the pair spent several months consulting specialists about the world's highest, lowest, smallest, etc.—"getting the 'ests' from the 'ists,'" as Norris once put it—and proceeded to compile the first *Guinness Book of Records* in just 16 weeks. Published in August 1955, the volume ranged from the world's tallest man—the nearly nine-foot-tall Robert Wadlow—to the fastest game bird—neither the grouse nor the plover, as it turned out, but the wood pigeon.

Sir Hugh lost his bet, but his brainchild went right to the top of England's bestseller list. (The book was published in the United States in 1956.) While those old Guinness books included some truly stomach-churning feats—Most Raw Eggs Eaten in Two Minutes (56)—few involved the risk of life, limb or even dignity. But by 1972, when BBC TV debuted the Guinness show "Record Breakers," that had changed. "Complete nutters would drop in on us constantly," Norris McWhirter told *Newsweek* in 1979. One man brought in an animal he thought was a small horse. "It turned out to be the world's largest dog," said McWhirter, "a Great Dane."

As for the twins, they leveraged their newfound fame, running for Parliament (unsuccessfully) and championing conservative causes (opposing the abuse of trade union power and supporting the rise of Margaret Thatcher). In 1975, Ross McWhirter offered a reward for the apprehension of Irish Republican Army terrorists. Three weeks later, he was gunned down on his London doorstep. A shaken and grieving Norris vowed to "soldier on." (The men responsible were arrested two weeks later, sentenced to life and freed after 22 years, as part of a peace agreement for Northern Ireland.)

At first, Norris later allowed, he was "rather chary" of stunts staged just to get in the book. "One has to continually preserve the purity of records," he said in a 1979 *Sports Illustrated* interview. "To qualify, something has to be universally competitive, peculiar, or unique." But gradually he began to include such records as eating a bicycle ground into metal filings and the longest time spent in a bathtub with live rattlesnakes. (This past June, soft-drink maker Snapple's attempt to install the world's largest popsicle in Lower Manhattan failed spectacularly when its 17.5-ton, 25-foot-long frozen pink treat began to melt in the summer sun, sending pedestrians scurrying.) Norris worked as the book's editor, and later as an adviser. He died in April 2004 at age 78.

Today, the book no longer accepts many records it once sanctioned. Lest anyone force-feed a poodle or ride a horse 10,000 miles, extreme pet records have been discontinued. To discourage parents from claiming the Youngest Child to Ride a Motorcycle or Swim the English Channel, an aspirant must be either age 14 with parental consent, or 18 without, to attempt the record for Longest Elvis Singing (25 hours 33 minutes 30 seconds) or any other marathon. Heeding medical advice, the company rejects claims for headstands, handstands, hunger strikes or sleep deprivation. Then there are the attempts that, even for Guinness, are just too inane. "We get claims from people who have worn a pair of socks for the longest, or have had a glass of milk in their fridge for seven years," says researcher Stuart Claxton.

STAGGERING THROUGH HIS LAST LAP on the JFK concourse, Ashrita Furman gets a second wind. Now each jerk of his head sends the orange a little farther. Oomph! Past cheering passengers. Oomph! Past lines of airport security guards, grinning, shaking their heads, pondering why a grown man might want to move a spheroid with his schnoz. Furman gives the orange a last nudge, and it zips past the finish. His time—24 minutes 36 seconds! A . . . new . . . world . . . record! Then, after sipping some orange juice, he begins hopping down the concourse to prepare for his next record attempt—hopping a mile.

What began with a brewer's bet has spawned a worldwide enterprise. Guinness World Records now has museums in tourist meccas from Niagara Falls to Los Angeles. Guinness television programs air in more than 85 countries. Its Web site handles 14 million hits a month, and the latest edition of *Guinness World Records* has sold 3 million copies in 23 languages. And there's no letup in sight. "We put records in the book to encourage people," says Stewart Newport. "I'd like to think that every record we have can be broken."

MOST STRAWS STUFFED IN MOUTH

Guinness chronicles some of the world's silliest stunts. On April 22, 2005, Switzerland's Marco Hort, age 20, set a new record by mouthing 258 straws for 10 seconds.

GUINNESS WORLD RECORDS

e-gad!

Americans discard more than 100 million computers, cellphones and other electronic devices each year. As "e-waste" piles up, so does concern about this growing threat to the environment

BY ELIZABETH ROYTE
PHOTOGRAPHS BY CHRIS JORDAN

ELECTRONIC WASTE is accumulating faster than anyone knows what to do with it, almost three times faster than ordinary household trash. Researchers at Carnegie Mellon University estimate that at least 60 million PCs have already been buried in U.S. landfills, and according to the National Safety Council, nearly 250 million computers will become obsolete between 2004 and 2009, or 136,000 a *day*. Where will all these gizmos go, and what impact will they have when they get there?

Before I started studying garbage for my book *Garbage Land: On the Secret Trail of Trash*, I had no clue that the computer on my desk was such a riot of precious-but-pernicious materials. A cathode ray tube (CRT) monitor contains two to eight pounds of lead; e-waste, including CRT televisions, is one of the largest sources of this toxic heavy metal in municipal dumps. Printed circuit boards are dotted with antimony, silver, chromium, zinc, tin and copper. My computer, if crushed in a landfill, might leach metals into soil and water. Burned in a trash incinerator, it would emit noxious fumes, including dioxins and furans. Though scrubbers and screens would catch much of those emissions, scientists consider even minute quantities of them, once airborne, to be dangerous. Prolonged exposure to some of the metals in electronic devices has been shown to cause abnormal brain development in children, and nerve damage, endocrine disruption and organ damage in adults.

The processes that give birth to computers and other electronic devices are also cause for concern. A 2004 United Nations University study found that it takes about 1.8 tons of raw materials—including fossil fuels, water and metal

Recycling computer components (detail of *Keyboards, New Orleans, 2005*) has benefits, but environmentalists and the electronics industry clash over methods and who should pay.

ores—to manufacture a desktop PC and monitor. Mining, the source of the semiprecious metals in electronics, is the nation's largest industrial polluter; 14 of the 15 largest Superfund sites, designated by the Environmental Protection Agency as containing hazardous waste that poses a threat to people or the environment, are metal mines.

And we are a nation that has environmental laws. To supply the demand for new copper, gold, silver and palladium—stuff that fuels our 'lectronic lifestyles—African and Asian nations are tearing up their lands. Some gorilla populations in the Democratic Republic of Congo have been cut nearly in half as the forest has been cleared to mine coltan, a metallic ore comprising niobium and tantalum that is a vital component in cellphones. (A couple of leading cellphone companies have said they are trying to avoid using coltan from Congo.) Americans discard about 100 million cellphones a year, and though entrepreneurs refurbish and sell many overseas, and many cellphones in the United States are donated to charities, tens of millions of cellphones nonetheless end up in the trash.

CAN A COMPUTER BE RECYCLED? I had a chance to find out when my network router quit connecting me to the Ethernet. I relegated this mysterious black box, the size of a hardcover book, to my basement until a local recycling group organized an e-waste drop-off.

I arrived at the collection site, in Brooklyn, to find several folding tables shaded by white tents. They were laden with unwanted monitors, scanners, TVs, cellphones, keyboards, printers, mice and cables, many of which had absolutely nothing wrong with them beyond a bit of dust and, in the case of the computers, a processing speed that only yesterday seemed dazzling. Passersby pawed through the electronics casbah, free to take what they wanted. Per Scholas, a nonprofit computer recycler that supplies schools and other nonprofits with hand-me-downs, was allowed the leftovers. But its representative could only look on stoically as the good stuff—which he could refurbish and sell—disappeared. The bad stuff, like my router, was headed his way. So was I.

After climbing through a dim stairwell in Per Scholas' rehabbed brick factory building in the South Bronx, I walked through a low defile of shrink-wrapped computer monitors stacked upon wooden pallets. Angel Feliciano, the company's vice president for recycling services, led me into a large open room, where technicians wiped computer hard drives clean. He told me that the reconditioned Pentium III-outfitted computers, collected from corporations and institutions that paid Per Scholas $10 a machine to haul them away, would be resold, at low cost, to "technology-deprived families." According to Feliciano, Per Scholas' efforts keep some 200,000 tons of electronic waste from landfills and incinerators each year.

Feliciano then took me to see the darker side of the computer recycling revolution, where monitors were being smashed, one by one, to smithereens. The broken-down (or merely out-of-date) Dells, Apples and Gateways trundled up a conveyor belt and into a shredding machine. Hidden inside the machine's carapace, magnets, eddy currents and trommel screens separated the shards and spat them into yard-high cardboard boxes: ferrous metals here, nonferrous there, plastic on one side, glass on the other. Feliciano said the metals went to a local company that resold them to smelters for separation and reuse; the plastic went to a company that pelletized it for resale. Disposing of the glass, which contains lead, presented the biggest headache.

"Glass is a liability, not a commodity," Feliciano told me. "We save it up until we've got a truckload, then we pay $650 a ton to a smelter who'll haul it away." Lately, the glass had been landing at the Doe Run Company, in south-central Missouri. The company recovers lead from glass through a process that begins with smelting and refining. One result is pure lead, made into 60-pound ingots, says Lou Magdits, Doe Run's raw-materials director. The company also salvages lead from car batteries, ammunition and wheel weights. And where does it all go? "Into car batteries, ammunition, wheel weights and new CRTs," says Magdits. (Doe Run operates a lead, copper and zinc plant in La Oroya, Peru. In 1999, that nation's Ministry of Health determined that 99 percent of the children in the area suffered from lead poisoning. The company, which bought the smelter from the Peruvian government in 1997, has entered into an agreement with the Health Ministry to reduce blood-lead levels in 2,000 of the most affected children and says that improved safety measures have decreased blood-lead levels in workers by 31 percent.)

Per Scholas seemed to be handling my e-waste responsibly. But 60 to 80 percent of e-waste collected for recycling is shipped overseas, mostly to China, India and Pakistan, according to the Silicon Valley Toxics Coalition (SVTC), an advocacy group. Perhaps half of those computers are cleaned up and resold. But the remainder are smashed up by laborers, many of whom scratch for precious metals in pools of toxic muck. Investigators from SVTC and the Basel Action Network—formed after the 1992 Basel Convention, an international treaty that limits trade in toxic waste, which the United States declines to sign—videotaped men, women and children in the Chinese village of Guiyu extracting copper yokes from monitors with chisels and hammers. Squatting on the ground, they liberated chips and tossed them into plastic buckets. Black smoke rose from burning piles of wire. The workers, who wore no protective gear, reportedly swirled a mixture of hydrochloric and nitric acid—caustic, highly poisonous chemicals—in open vats, trying to extract gold from components. Afterward, they dumped the computer carcasses and the black sludge into fields and streams. Tests on the soil and water showed levels of lead, chromium and barium that were hundreds of times higher than those allowed by U.S. and European environmental health stan-

Adapted by the author from *Garbage Land: On the Secret Trail of Trash* by Elizabeth Royte. Copyright © 2005 by Elizabeth Royte. Published by Little, Brown and Company, Time Warner Book Group.

A growing number of U.S. firms dismantle used computers and send valuable parts (*Circuit Boards #2, New Orleans, 2005*) to companies that glean the semiprecious metals.

ALL: CHRIS JORDAN / PAUL KOPEIKIN GALLERY, LOS ANGELES & TOSSI MILO GALLERY, NEW YORK

dards. The accumulating chemicals have contributed to high rates of birth defects, infant mortality, blood diseases and severe respiratory problems, according to Chinese media.

Why is it so difficult to recycle computers properly? For starters, it is dangerous, labor-intensive and expensive, and markets for the materials aren't always large or reliable. The incentives are for new production and the disposal or export of old components. Some computer manufacturers reportedly lobby to make "gray market" refurbishing illegal in developing nations where they sell new models. At the state level, governments spend bond money on incinerators and landfills, but most recycling centers have to balance the books on their own. Federal mining subsidies further skew computer economics. "If we were paying what we should for virgin resources, e-waste recycling would be much more economical, and local governments perhaps could break even on e-waste recycling," says Eve Martinez, a recycling activist in New York City.

ELIZABETH ROYTE writes about science and the environment from her home in Brooklyn. CHRIS JORDAN *is based in Seattle.*

As public awareness of the hazards of e-waste has risen, some computer manufacturers have begun take-back programs in which consumers wipe their hard drives clean and return the units to manufacturers. But the cost and the inconvenience to consumers discourage widespread participation. Computer retailers aren't wild about the idea, either. When I asked staffers at one of the largest computer merchants in New York City about taking back my gently used notebook computer, they said they didn't do it, didn't know anything about it and had never before been asked about it.

Still, some states are forging ahead with e-waste reforms. Massachusetts bans televisions and computers from landfills. ElectroniCycle, a company based in Gardner, Massachusetts, processes the state's e-waste, recovering ten million pounds of components a year. Technicians refurbish 5 to 10 percent of the computers for resale; send another 5 to 10 percent to specialty repair houses; and smash the rest into 50 types of scrap, including plastic, copper, barium glass, and leaded and mixed glass. Reusable integrated circuits and memory cards are gleaned, while circuit boards are sent elsewhere for recovery of gold, palladium, silver and copper. In California, which bans e-waste from landfills and also from being shipped overseas, retailers that sell hazardous electronic equipment are now required to pay the state an "advanced

Americans discard about 100 million cellphones annually (detail of *Cellphones, Orlando, 2004*), and though many of the phones are reused, tens of millions are just thrown away.

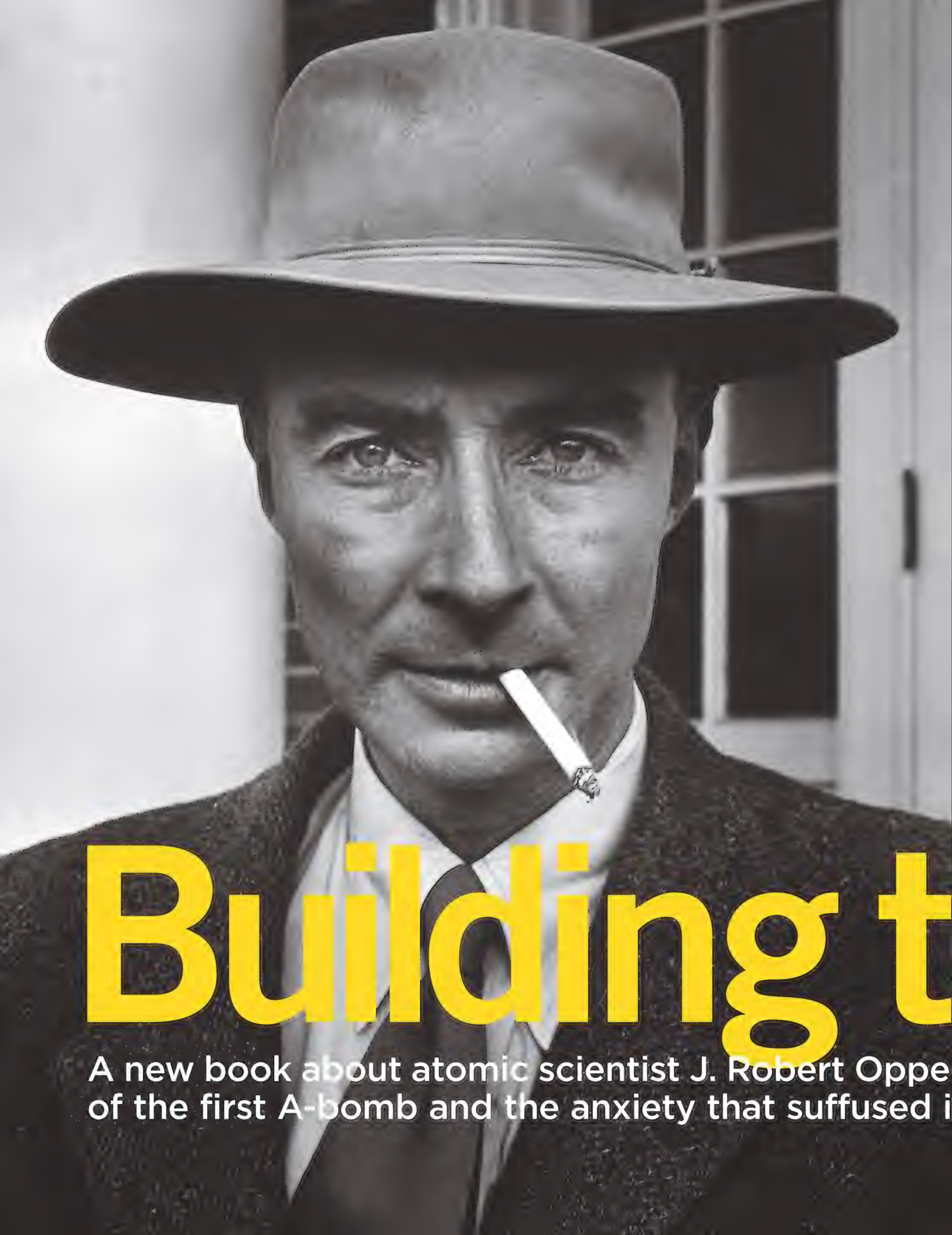
recovery fee" (collected from consumers) of between $6 and $10 per device to cover recycling. Almost half the states have active or pending e-waste take-back legislation. Maine recently passed a law that will require manufacturers of computer monitors, video display devices and televisions to finance a system for environmentally responsible recycling.

In 2001, more than a dozen social justice and environmental groups formed the Computer TakeBack Campaign, which calls for manufacturers of anything with a circuit board to make "extended producer responsibility" (EPR) part of their credo. EPR would shift collection and recycling costs from taxpayers and government to companies, theoretically giving them an incentive to make computers and other gadgets that last longer, are made of reusable or recyclable materials, contain fewer toxics, and are shipped in less packaging. In Europe, EPR is gaining support. The European Union has adopted a directive requiring producers of electronics to recover and recycle e-waste. In Switzerland, the cost of recycling is built into the purchase price of new equipment; consumers return e-waste to retailers, who pass it on to licensed recyclers.

But in the United States, electronics recycling is in an awkward in-between stage, neither fully regulated nor completely understood by a tech-obsessed public that wants to do right by its e-waste. Still, there have been some recent improvements: spurred by U.S. advocacy groups and European nations that restrict the use of certain materials, computer manufacturers have reduced or eliminated some toxins in their products and made their computers easier to take apart. The Electronic Industries Alliance promotes recycling but opposes regulations that would make manufacturers alone bear the costs. The Consumer Electronics Retailers Coalition, which also promotes recycling, opposes systems, like that in California, in which retailers collect fees to cover recycling programs.

Speaking in 2002 at an industry trade show called Waste Expo, a Sony executive suggested dumping e-waste into open-pit hard-rock mines. One pit would hold 72 billion PCs—enough to make it worthwhile to mine the waste for copper, gold, iron, glass and plastics. Eyebrows were raised. Wouldn't deep pits of toxics-laced computers add insult to ecosystems that were already injured? Would miners extract the valuable metals using cyanide and arsenic, then walk away from what remained? The idea, mercifully, sank. Visionaries imagine a day when electronic devices are shipped back to their makers, who design all components with safe reuse in mind. Until then, maybe shoving the stuff in the basement or attic isn't such a bad idea after all.

For more on recycling electronic devices, go to www.smithsonianmag.com.



Building t

A new book about atomic scientist J. Robert Oppe
of the first A-bomb and the anxiety that suffused i

he Bomb

nheimer charts the secret debate over deployment
ts first live test **BY KAI BIRD AND MARTIN J. SHERWIN**

J. Robert Oppenheimer was born to wealthy parents in New York City in 1904. The Depression at home and the rise of Fascism abroad drew him to progressive politics during his tenure as a professor of physics at the University of California at Berkeley.

In 1942, he joined a select group of physicists investigating whether the development of an atomic bomb was possible. Impressed by Oppenheimer's ideas and intelligence, Gen. Leslie R. Groves, the Army officer in charge of the Manhattan Project, appointed him to be the director of the Los Alamos Scientific Laboratory, despite some objections from the project's security staff.

The new lab opened in April 1943 with just a few hundred scientists. Los Alamos soon became a "secret city" housing some 6,000 men and women. Just 27 months later, Oppenheimer—known as "Oppie"—and his colleagues were ready to test an atomic weapon. Everyone at Los Alamos in a position to have an informed opinion agreed that without Oppenheimer's extraordinary leadership, atomic bombs would not have been completed in time to be used during the war. That was both a matter of pride and a heavy burden for "the father of the atomic bomb."

Everyone sensed Oppie's presence. He drove himself around the Hill in an Army jeep or in his own large black Buick, dropping in unannounced on one of the laboratory's scattered offices. Usually he'd sit in the back of the room, chain-smoking and listening quietly to the discussion. His mere presence seemed to galvanize people to greater efforts. Victor "Viki" Weisskopf, a physicist recruited to Los Alamos, marveled at how often Oppie seemed to be physically present at each new breakthrough: "He was present in the laboratory or in the seminar rooms when a new effect was measured, when a new idea was conceived. It was not that he contributed so many ideas or suggestions; he did so sometimes, but his main influence came from something else. It was his continuous and intense presence, which produced a sense of direct participation in all of us." Hans Bethe, head of the lab's theoretical physics division, recalled the day Oppie listened to an inconclusive debate over what type of container should be used for melting plutonium. After listening to the argument, Oppie summed up the discussion. He didn't directly propose a solution, but by the time he left the room the right answer was clear to all.

Restlessness was also part of his character—or so thought young physicist Freeman Dyson. But Dyson also saw restlessness as Oppie's tragic flaw: "Restlessness drove him to his supreme achievement, the fulfillment of the mission of Los Alamos, without pause for rest or reflection."

By the end of 1944, six months after the Allies had landed on the beaches of Normandy, it was clear that the war in Europe would soon be over, and a num-

Before the first A-bomb test (Robert Oppenheimer, right, scouts for an appropriate site; he named the choice Trinity, whose Base Camp is below), Frank Oppenheimer felt it only prudent to prepare for disaster. "We spent several days finding escape routes through the desert," he said, "and making little maps so everybody could be evacuated."

KENNETH BAINBRIDGE / AIP EMILIO SERGE VISUAL ARCHIVES; CORBIS; P. 88 ALFRED EISENSTAEDT / TIME LIFE PICTURES / GETTY IMAGES; P. 89 LOS ALAMOS NATIONAL LABRATORY

BETTMANN / CORBIS

Before Germany surrendered, scientists at Los Alamos fretted that their former colleagues, physicists now working for the Nazis, might develop a bomb. "One didn't want to lose a single day, a single week," said one Manhattan Project physicist. (Above: Project scientists, from left to right: Kenneth Bainbridge, Joseph Hoffman, Oppenheimer, Louis Hempelman, Robert Bacher, Victor Weisskopf, Richard Dodson.)

ber of the scientists at Los Alamos began to voice their growing ethical qualms about the continued development of the "gadget." Robert Wilson, chief of the lab's experimental physics division, had long discussions with Oppenheimer about how the bomb might be used. Wilson proposed holding a formal meeting to discuss the matter more fully. "He tried to talk me out of it," Wilson later recalled, "saying I would get into trouble with the G-2, the security people."

Despite his respect, even reverence, for Oppenheimer, Wilson thought little of this argument. He put up notices all over the lab announcing a public meeting to discuss "The Impact of the Gadget on Civilization."

To his surprise, Oppenheimer showed up on the appointed evening and listened to the discussion. Wilson later thought about 20 people attended. "We did have a pretty intense discussion of why it was that we were continuing to make a bomb after the war had been [virtually] won."

A young physicist working on implosion techniques, Louis Rosen, remembered a packed daytime colloquium at which Oppenheimer was the speaker and, according to Rosen, the topic was "whether the country is doing the right thing in using this weapon on real live human beings." Oppenheimer apparently argued that as scientists they had no right to a louder voice in determining the gadget's fate than any other citizen. "He was a very eloquent and persuasive guy," Rosen said. Chemist Joseph O. Hirschfelder recalled a similar discussion held in Los Alamos' small wooden chapel in the midst of a thunderstorm on a cold Sunday evening in early 1945. On this occasion, Oppenheimer argued that although they were all destined to live in perpetual fear, the bomb might also end all war. Such a hope was persuasive to many of the assembled scientists.

On another occasion, Oppenheimer argued that the war should not end without the world knowing about this primordial new weapon. If the gadget remained a military secret, then the next war would almost certainly be fought with atomic weapons, and they would be used in a surprise attack. The scientists had to forge ahead, he explained, to the point where it could at least be tested.

ON THURSDAY AFTERNOON, April 12, 1945—just two years after the lab's opening—word suddenly spread that Franklin Roosevelt had died. Oppenheimer scheduled a memorial service for that Sunday. "We have been living through years of great evil," he said in his eulogy, "and great terror." And

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during this time Roosevelt had been, "in an old and unperverted sense, our leader." Roosevelt had inspired millions around the globe to have faith that the terrible sacrifices of this war would result in "a world more fit for human habitation." For this reason, Oppenheimer concluded, "we should dedicate ourselves to the hope, that his good works will not have ended with his death."

Oppenheimer still nurtured the hope that Roosevelt and his men had learned that the formidable new weapon would require a radical new openness. "Well," he told his assistant David Hawkins after the eulogy, "Roosevelt was a great architect, perhaps Truman will be a good carpenter."

The war in the Pacific was coming to its bloodiest climax as Harry Truman moved into the White House. On the evening of March 9, 1945, three hundred thirty-four B-29 aircraft dropped tons of jellied gasoline—napalm—and high explosives on Tokyo. The firestorm killed an estimated 100,000 people and completely burned out 16 square miles of the city. The firebombing raids continued, and by July 1945 all but five of Japan's major cities had been attacked and hundreds of thousands of civilians had been killed. This was total warfare, an attack aimed at the destruction of a nation, not just its military targets.

Secretary of War Stimson (arriving at the White House) regarded the bomb not "as a new weapon merely but as a revolutionary change in the relations of man to the universe."

The firebombings were no secret. Ordinary Americans read about them in their newspapers. Thoughtful people understood that strategic bombing of cities raised profound ethical questions. "I remember [Secretary of War Henry] Stimson saying to me," Oppenheimer later remarked, "that he thought it appalling that there should be no protest over the air raids which we were conducting against Japan, which in the case of Tokyo led to such extraordinarily heavy loss of life. He didn't say that the air strikes shouldn't be carried on, but he did think there was something wrong with a country where no one questioned that. . . . "

On April 30, 1945, Adolf Hitler committed suicide, and seven days later Germany surrendered. When the physicist Emilio Segrè heard the news, his first reaction was, "We have been too late." Like almost everyone at Los Alamos, Segrè thought that defeating Hitler was the sole justification for working on the gadget. "Now that the bomb could not be used against the Nazis, doubts arose," he wrote in his memoirs. "Those doubts, even if they do not appear in official reports, were discussed in many private discussions."

On May 31, Oppenheimer attended a critical meeting of Stimson's so-called Interim Committee, an ad hoc group of government officials brought together to advise the secretary of war on the future of atomic policy.

Stimson controlled the agenda—and it did not include a decision on whether the bomb should be used against Japan. That was more or less a foregone conclusion. Decisions on the military use of the bomb would be controlled exclusively by the White House, with no input from the scientists who had been building it. But Stimson had paid careful attention to all the discussions regarding the implications of nuclear weapons. Oppenheimer and the other scientists thus were reassured to hear him say that he and the other members of the Interim Committee did not regard the bomb "as a new weapon merely but as a revolutionary change in the relations of man to the universe." The atomic bomb might become "a Frankenstein which would eat us up," Stimson said, or it could secure the global peace. Its import, in either case, "went far beyond the needs of the present war."

When Stimson asked about the nonmilitary potential of the project, Oppenheimer dominated the discussion. He pointed out that up until then their "immediate concern had been to shorten the war." But it should be understood, he said, that "fundamental knowledge" about atomic physics was "so widespread throughout the world" that he thought it wise for the United States to offer a "free interchange of information" on the development of peacetime uses of the atom. "If we were to offer to exchange information before the bomb was actually used," he went on, "our moral position would be greatly strengthened."

Over lunch, someone raised the question of the use of the bomb on Japan. No notes were taken, but when the formal meeting resumed, the discussion continued to focus on the effect of the impending bombing. Someone commented that one atomic bomb would have no more effect than some of the massive bomber strikes launched against Japanese cities that spring. Oppenheimer seemed to agree, but added that "the visual effect of an atomic bombing would be tremendous. It would be accompanied by a brilliant luminescence which would rise to a height of 10,000 to 20,000 feet. The neutron effect of the explosion would be dangerous to life for a radius of at least two-thirds of a mile."

"Various types of targets and the effects to be produced"

KAI BIRD is the author of three books of 20th-century American history. MARTIN J. SHERWIN *is a professor of English and American history at Tufts University.*

HARRY S. TRUMAN PRESIDENTIAL LIBRARY; P. 93 CORBIS; WHITE SANDS MISSILE RANGE

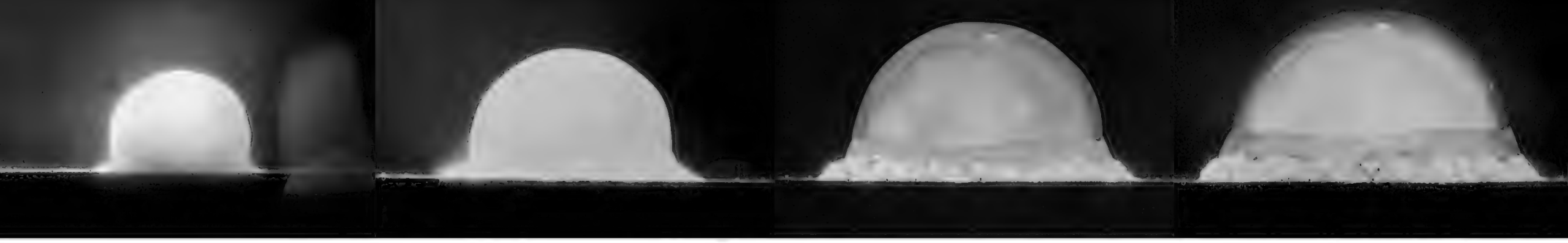
were discussed, and then Secretary Stimson summarized what seemed to be a general agreement: ". . . that we could not give the Japanese any warning; that we could not concentrate on a civilian area; but that we should seek to make a profound psychological impression on as many of the inhabitants as possible." Stimson said he agreed with Harvard president James Conant's suggestion "that the most desirable target would be a vital war plant employing a large number of workers and closely surrounded by workers' houses." Thus, with such delicate euphemisms, did the president of Harvard University select civilians as the target of the world's first atomic bomb. On June 16, 1945, Oppenheimer signed a short memorandum summarizing the recommendations of the top Manhattan Project scientists "on the immediate use of nuclear weapons." Addressed to Secretary Stimson, it was a diffident document. The panel members recommended, first, that prior to the use of the bomb, Washington should inform Britain, Russia, France and China of the existence of atomic weapons and "welcome suggestions as to how we can cooperate in making this development contribute to improved international relations." Second, the panel reported that there was no unanimity among their scientific colleagues on the initial use of these weapons. Some of the men who were building them proposed a demonstration of the gadget as an alternative. "Those who advocate a purely technical demonstration would wish to outlaw the use of atomic weapons, and have feared that if we use the weapons now our position in future negotiations will be prejudiced." Although Oppenheimer surely sensed that most of his colleagues favored such a demonstration, he now weighed in on the side of those who "emphasize the opportunity of saving American lives by immediate military use. . . . "

As thunderclouds moved in the afternoon before the Trinity test, threatening to postpone the detonation, Oppenheimer drove from Base Camp to the tower (below) on which his "gadget" would be imploded. Alone, he climbed the tower and inspected his creation, an ugly metal globe studded with detonator plugs. Everything seemed to be in order.

By the spring of 1945, the combat zones of the Pacific had become brutal killing fields. On April 6, in response to the American invasion of Okinawa, Japan unleashed its most desperate effort to stave off defeat—kamikaze planes that attacked American ships. On land, the carnage was even more brutal. But when the three-month battle was over, 7,400 Japanese soldiers surrendered, a sign that a sense of inevitable loss had penetrated the rank and file of Japan's army.

Similarly, Japan's government was confronting defeat. The Truman administration had decoded intercepted cables indicating that the emperor himself was participating in the "struggle to surrender." In July, President Truman noted in his handwritten diary that he had read a message to Stalin from the "Jap Emperor asking for peace." That cable, and others like it, revealed that the major sticking point was a clarification of "unconditional surrender": Tokyo wanted a promise from Washington that the emperor would not be harmed or humiliated.

Truman was also aware that Stalin was committed to enter the war against Japan no later than August 15, and that this event was likely to compel Tokyo to surrender. The first phase of the U.S. ground invasion was not scheduled to begin until November 1. But by the early summer of 1945, Truman had been persuaded that it would be better to end the war before Soviet troops attacked Japan, and if atomic bombs were available, they should be used for that purpose. None of these facts were known to Robert Oppenheimer or to any of the physicists working under his direction to produce atomic bombs before the war ended.



THE SUMMER OF 1945 was unusually hot and dry on the mesa. Oppenheimer pushed the men in the Tech Area to work longer hours; everyone seemed on edge. Oppenheimer was convinced that a full-scale test of the bomb was absolutely necessary because of the "incompleteness of our knowledge." Without a test, he told Gen. Leslie Groves, "the planning of the use of the gadget over enemy territory will have to be done substantially blindly."

More than a year earlier, Oppenheimer had spent three days and nights bouncing around the barren, dry valleys of southern New Mexico in a three-quarter-ton Army truck, searching for a suitably isolated stretch of wilderness where the bomb could be safely tested. Accompanying him were Kenneth Bainbridge, an experimental physicist from Harvard, and several Army officers. For Oppenheimer, it was a rare opportunity to savor the Spartan desert he so loved. Several expeditions later, Bainbridge selected a desert site 60 miles northwest of Alamogordo. The Spanish had called the area the Jornada del Muerto—"Journey of the Dead Man."

Here the Army staked out an area 18 by 24 miles in size, evicted a few ranchers by eminent domain and began building a field laboratory and hardened bunkers from which to observe the first explosion of an atomic bomb. Oppenheimer dubbed the test site "Trinity."

General Groves' timetable for testing the bomb was driven by President Truman's scheduled meeting with Stalin and Churchill in Potsdam in mid-July. Groves wanted a tested and usable bomb in Truman's hands before that conference ended. By the end of June, after further pressure from Groves, Oppenheimer told his people that they were now aiming for Monday, July 16.

On the evening of July 11, 1945, Robert Oppenheimer said goodbye to Kitty, his wife. He told her that if the test was successful, he would get a message to her saying, "You can change the sheets." For good luck, she gave him a four-leaf clover from their garden.

As if people were not already anxious enough, a last-minute test-firing of the implosion explosives indicated that the bomb was likely to be a dud. Everyone began quizzing George Kistiakowsky, their explosives expert. "Oppenheimer became so emotional," Kistiakowsky later recalled, "that I offered him a month's salary against ten dollars that our implosion charge would work."

Two nights before the test, Oppenheimer slept only four hours; an officer trying to sleep on a bunk in the next room heard him coughing miserably half the night. Oppenheimer awoke that Sunday, July 15, exhausted and still depressed by the news of the previous day. But as he ate breakfast in the Base Camp mess hall, he received a phone call from Hans Bethe informing him that the implosion test had failed only because of flawed detectors. There was no reason, Bethe went on, why Kistiakowsky's design on the actual device shouldn't work. Relieved, Oppenheimer now turned his attention to the weather. That morning the skies over Trinity were clear, but his meteorologist, Jack Hubbard, told him that the winds around the site were picking up. Speaking on the phone to Groves shortly before the general flew in from California for the test, Oppie warned, "The weather is whimsical."

That night, Oppenheimer hung out in the Base Camp

LOS ALAMOS NATIONAL LABORATORY (8)

mess hall, alternately gulping down black coffee and rolling one cigarette after another, and smoking them nervously down to the butt. For a time, he pulled out a copy of Baudelaire and sat quietly reading poetry. By then, the storm was pelting the tin roof. As lightning flashes pierced the darkness outside, physicist Enrico Fermi, fearing that the storm's winds might drench them with radioactive rain, said he favored a postponement. "There could be a catastrophe," he warned Oppenheimer.

But meteorologist Hubbard assured Oppie that the storm would pass before sunrise. Hubbard recommended postponing the hour of detonation, moving it from 4:00 to 5:00 a.m. At one point, an agitated Groves pulled Oppenheimer aside and listed all the reasons why the test should proceed. Both men knew that everyone was so exhausted that any postponement would have meant delaying the test for at least two or three days. Worried that some of the more cautious scientists might convince Oppie to postpone the test, Groves took him to the control center at South Shelter, less than six miles from the Trinity site.

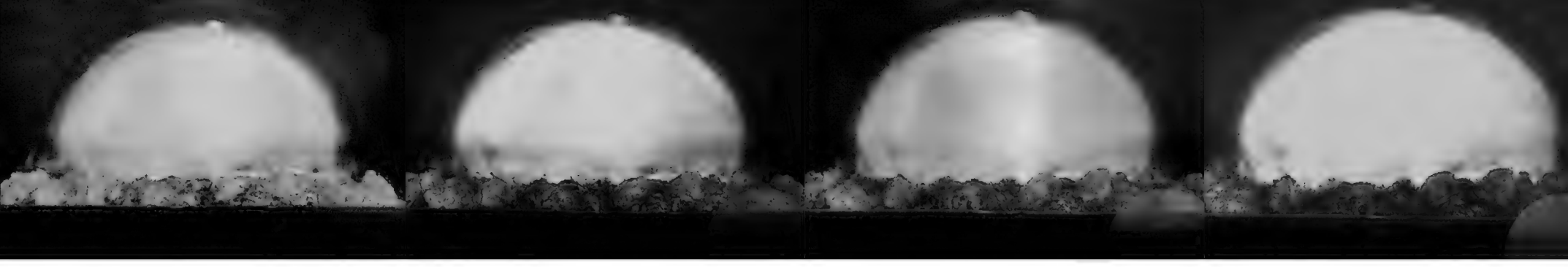
At 2:30 a.m., the whole test site was being raked by 30-mile-an-hour winds and severe thundershowers. Still, Jack Hubbard and his small team of forecasters predicted that the storm would clear by dawn. Outside the bunker, Oppenheimer and Groves paced the ground, glancing to the skies every few minutes to see if they could discern a change in the weather. Finally, they announced their decision: they would schedule the test for 5:30 a.m. and hope for the best. An hour later, the skies began to clear and the wind abated. At 5:10 a.m., a voice boomed across a loudspeaker outside the control center, "It is now zero minus twenty minutes."

Young physicist Richard Feynman was standing 20 miles from the Trinity site when he was handed dark glasses. He decided he wouldn't see anything through them, so instead he climbed into the cab of a truck facing Alamogordo. The truck windshield would protect his eyes from harmful ultraviolet rays, and he'd be able to see the flash. Even so, he reflexively ducked when the horizon lit up. When he looked up again, he saw a white light changing into yellow and then orange: "A big ball of orange, the center that was so bright, becomes a ball of orange that starts to rise and billow a little bit and get a little black around the edges, and then you see it's a big ball of smoke with flashes on the inside of the fire going out." A full minute and a half after the explosion, Feynman finally heard an enormous bang, followed by the rumble of man-made thunder. Physicist Bob Serber said, "I could feel the heat on my face a full 20 miles away."

James Conant had expected a relatively quick flash of light. But the white light so filled the sky that for a moment he thought "something had gone wrong" and the "whole world has gone up in flames."

Joe Hirschfelder, the chemist assigned to measure the radioactive fallout from the explosion, described the moment: "After about five seconds the darkness returned but with the sky and the air filled with a purple glow, just as though we were surrounded by an aurora borealis. . . . We stood there in awe as the blast wave picked up chunks of dirt from the desert soil and soon passed us by."

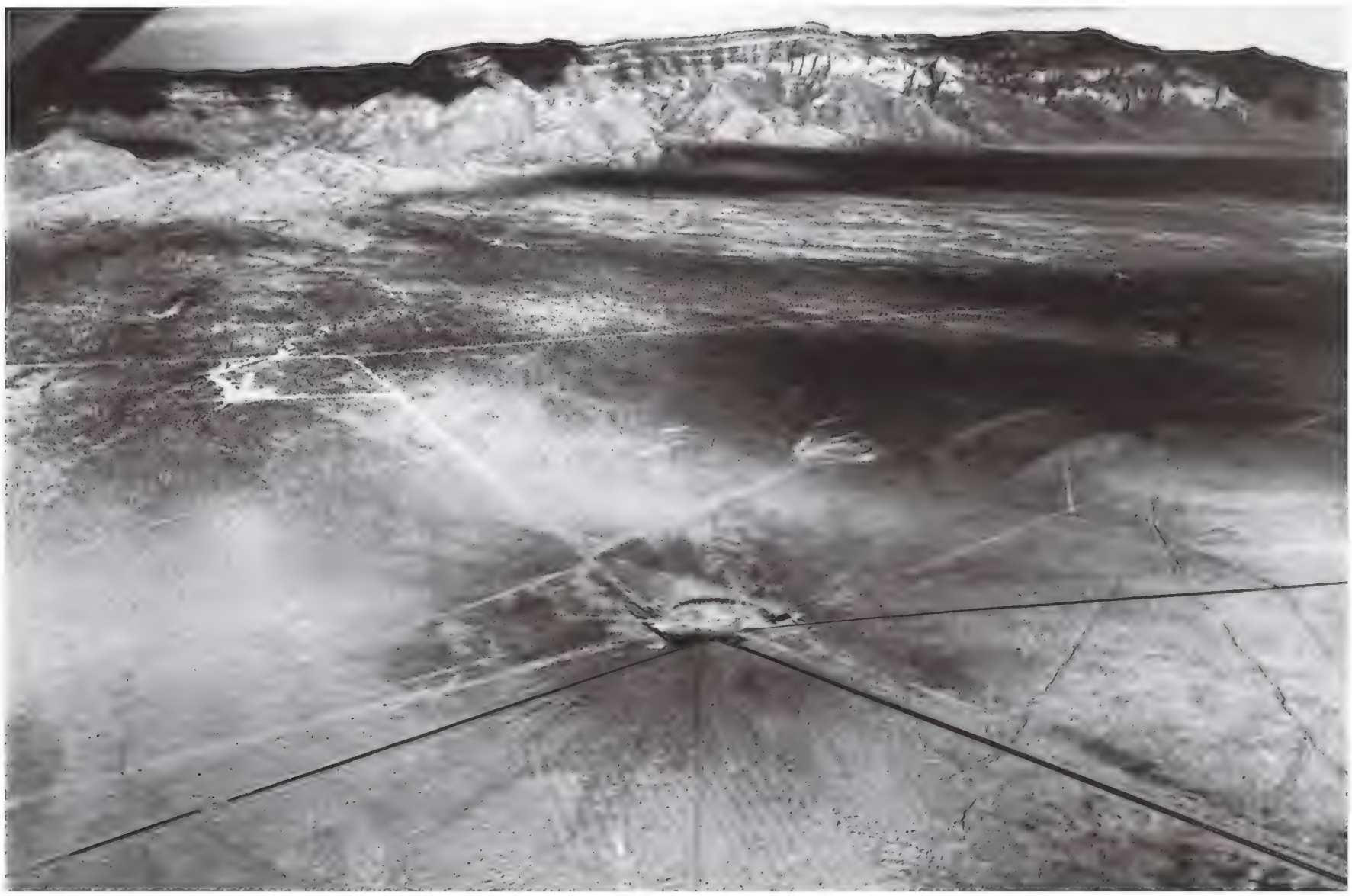
Frank Oppenheimer, also a Los Alamos physicist, was next to his brother Robert when the gadget exploded. Though he was lying on the ground, "the light of the first flash penetrated and came up from the ground through one's [eye]lids. When one first looked up, one saw the fireball, and then almost immediately afterwards, this unearthly hovering cloud. It was very bright and very purple." Frank thought, "Maybe it's going to drift over the area and engulf us." He hadn't expected the heat from the flash to be nearly that intense. In a few moments, the thunder of the blast was bouncing back and forth on the distant mountains. "But I think the most terrifying thing," Frank recalled, "was this really brilliant purple cloud, black with radioactive dust, that hung there, and you had no feeling of whether it would go up or would drift towards you."



After the first atomic bomb explosion (seen here from 10,000 yards away, in a time series from .006 seconds to .081 seconds after detonation), Oppenheimer recalled, "a few people laughed, a few people cried. Most people were silent."

Oppenheimer was lying facedown, just outside the control bunker, 10,000 yards south of ground zero. As the countdown reached the two-minute mark, he muttered, "Lord, these affairs are hard on the heart." Groves' executive officer General Farrell watched him closely as the final countdown commenced: "Dr. Oppenheimer . . . grew tenser as the last seconds ticked off. He scarcely breathed. . . . For the last few seconds he stared directly ahead and when the announcer shouted 'Now!' and there came this tremendous burst of light followed abruptly thereafter by the deep growling of the explosion, his face relaxed into an expression of tremendous relief."

Afterward, physicist Isidor Rabi caught sight of Oppie from a distance. Something about his gait, the easy bearing of



To relieve tension before the test, some scientists bet on the size of the explosion. Oppenheimer bet low, a modest 3,000 tons. Isidor Rabi bet 18,000 tons; he won (the crater, above). Enrico Fermi took side bets on whether the bomb would ignite the atmosphere.

BETTMANN / CORBIS

a man in command of his destiny, made Rabi's skin tingle: "I'll never forget the way he stepped out of the car . . . his walk was like *High Noon* . . . this kind of strut. He had done it."

Later that morning, when William L. Laurence, the *New York Times* reporter selected by Groves to chronicle the top-secret event, approached him for comment, Oppenheimer described his emotions in pedestrian terms. The effect of the blast, he told Laurence, was "terrifying" and "not entirely undepressing." After pausing a moment, he added, "Lots of boys not grown up yet will owe their life to it."

Whatever Oppenheimer thought, it is certain that the men around him felt unvarnished euphoria. Laurence described their mood in his dispatch: "The Big Boom came about 100 seconds after the Great Flash—the first cry of a new-born world. It brought the silent, motionless silhouettes to life, gave them a voice. A loud cry filled the air. The little groups that hitherto had stood rooted to the earth like desert plants broke into a dance." The dancing lasted but a few seconds and then the men began shaking hands, Laurence reported, "slapping each other on the back, laughing like happy children." Kistiakowsky, who had been thrown to the ground by the blast, threw his arms around Oppie and gleefully demanded his ten dollars. Oppie pulled out his empty wallet, and told Kisty he'd have to wait. (Later, back in Los Alamos, Oppie made a ceremony of presenting Kistiakowsky with an autographed ten-dollar bill.)

As Oppenheimer left the control center, he turned to shake hands with Ken Bainbridge, who looked him in the eye and muttered, "Now we're all sons-of-bitches." Back at Base Camp, Oppie shared a brandy with his brother and General Farrell. Then, according to one historian, he phoned Los Alamos and asked his secretary to pass a message to Kitty: "Tell her she can change the sheets."

On August 6, 1945, the *Enola Gay*, a B-29, dropped an atomic bomb on Hiroshima, killing more than 70,000 people. Three days later, another atomic bomb devastated Nagasaki. The Japanese surrendered on August 15.

In 1947, Oppenheimer became director of the Institute for Advanced Study in Princeton. As chairman of the General Advisory Committee to the Atomic Energy Commission, he warned against entering an arms race with the Soviet Union and against developing the even more powerful hydrogen bomb.

The enemies these efforts made for him concocted charges of disloyalty, and following a hearing before the Atomic Energy Commission in 1954, Oppenheimer's security clearance was rescinded. He became the red scare's most prominent victim. Ironically, this enhanced his fame: where once he had been known as the "father of the atomic bomb," he now became even more Promethean—a martyred scientist, like Galileo. He died in 1967 at age 62.

GHOST OF A CHANCE

HOW DID THE IVORY-BILLED WOODPECKER, WHICH WAS FEARED EXTINCT, HANG ON ALL THESE YEARS? **BY SCOTT WEIDENSAUL**

THE NEWS, which came to me in a cryptic telephone call one day this past February, was electrifying: the ivory-billed woodpecker, mourned as extinct for more than 60 years, had been found in the swamp forests of eastern Arkansas. I was being asked to accompany a search party that was conducting its work in extraordinary secrecy. For long moments, I forgot to breathe; for the next two nights, the excitement and awe kept me wide awake.

Any birder would have been thrilled, but I've long had a special interest in "ghost species," creatures of such surpassing rarity that we cannot say whether they are alive or extinct. I've chased the fading trail of these almost mythical animals from the mountains of Tasmania to the jungles of Brazil. Still, the ivory-bill had always exerted the strongest pull—and engendered the greatest heartache.

We who love wild America, who feel a personal grief over the spectacles we'll never see—prairies awash with millions of bison, flocks of passenger pigeons whose wings roared like hurricanes, the green-and-yellow shock of Carolina parakeets whirling through an Illinois woodland—had always counted the ivory-bill as one of the heaviest losses. Never merely a bird, the great woodpecker, with its black-and-white wings and the male's scarlet crest, was an icon of the immense swamp forest wilderness that stretched from Nashville to New Orleans, east to Florida, and up to the Carolinas. One folk name for the animal was the "Lord God" bird, because, the story goes, a person seeing an ivory-bill fly by on its two-and-a-half-foot wingspan often gasped, "Lord God, what a bird!"

Paddling the Cache River, Sparling says, his mind kept balking at the enormousness of the find: "It's an ivory-bill!"

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The ivory-bill's forest habitat fell under the blades of loggers almost from the earliest days of colonization, but the timbering reached a frenzy from the late 1880s until World War II. The bird became synonymous with extinction, a haunting reminder of what a culture may lose when it squanders its natural wealth. Like a dying flame, the great woodpecker flickered several times; it was given up for extinct in the 1920s before a pair were rediscovered in Florida, only to be shot by specimen collectors. It was again consigned to extinction, and again found, in the 1930s in Louisiana.

That small population, at most just seven pairs in the 120 square miles of old-growth forest known as the Singer Tract, became the focus of scientific study and a ferocious conservation effort, even as the loggers of the Chicago Mill and Lumber Company cut deeper and deeper into the swamps. In 1943, Chicago Mill brushed aside pleas from four Southern governors, several federal agencies and the National Audubon Society that these last woods be saved as a refuge. ("We are just money grubbers," the company's chairman said by way of explanation.) By 1944 the Singer Tract was becoming a wasteland, its giant sweet gums cut to make tea boxes for the British, and the last ivory-bill, a female, had vanished. The guttering candle, it seemed, had gone out.

Only rumors were left. Several ornithologists claimed to have seen the bird in Florida and Georgia in the 1950s, though without documentation, and one naturalist made a tape-recording of what he said was the animal's weird *kent-kent* calls in East Texas in the late 1960s. Two photographs from the Atchafalaya Basin in Louisiana surfaced in 1971, and while one respected ornithologist thought they were authentic, other experts derided them as a hoax. The Cuban ivory-bill, a distinct subspecies, was rediscovered in the 1980s, then disappeared again. Most experts dismissed the periodic ivory-bill reports in the United States as mistaken sightings of its widespread but smaller cousin, the pileated woodpecker. On those occa-

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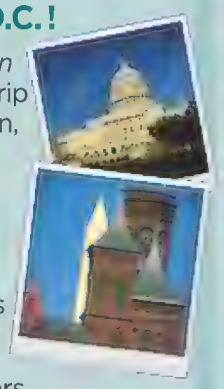

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sions when a sighting was followed up, including a well-outfitted, month-long search by a six-person team in Louisiana in 2002, nothing came of them.

A FEW DAYS AFTER learning of the bird's survival, I was deep in the Cache River National Wildlife Refuge, part of the 550,000-acre swamp forest known as the Big Woods, which runs 130 miles along Arkansas' Mississippi Delta. Sunlight streamed through the winter-bare canopies of the tupelos and cypresses. Some of the trees were old behemoths that had escaped the ax, but most were second-growth, well on their way to maturity. Wood ducks lifted off the river in little explosions of spray, and beavers slapped their tails against the water in alarm.

I accompanied a lean, bearded man named Gene Sparling, who had been paddling through this remote part of the Cache a year earlier when a huge woodpecker flew out of the woods.

MARK GODFREY / NATURE CONSERVANCY

Luneau (checking a motion-activated camera): Just a few seconds of "proof."

Sparling, an experienced outdoorsman and birder from Hot Springs, knew instantly what it was, but says his mind kept balking at the enormousness of it: "'It's an ivory-billed woodpecker,' I thought. 'But they're extinct. You can't see an extinct bird. But it's an ivory-bill.' My mind just got stuck in this loop."

This is where most ivory-bill stories end; someone is certain he's seen one, but there are no witnesses, no photographs, no proof. This time was different. Two weeks later, Sparling was back, leading Tim Gallagher, of Cornell University's Lab of Ornithology, and Bobby Harrison, a photography professor from Alabama, who had been to Arkansas shortly before to check out earlier rumors. As Gallagher and Harrison paddled to the site of Sparling's encounter, an ivory-bill flapped out of the trees. They pointed and shouted; the woodpecker flared off and disappeared into the woods. Harrison, who had been searching for the ivory-bill for years, broke down in tears. Telling me the story a year later, he did so again.

Within weeks, one of the most intensive and secretive wildlife searches in history was under way, led by the

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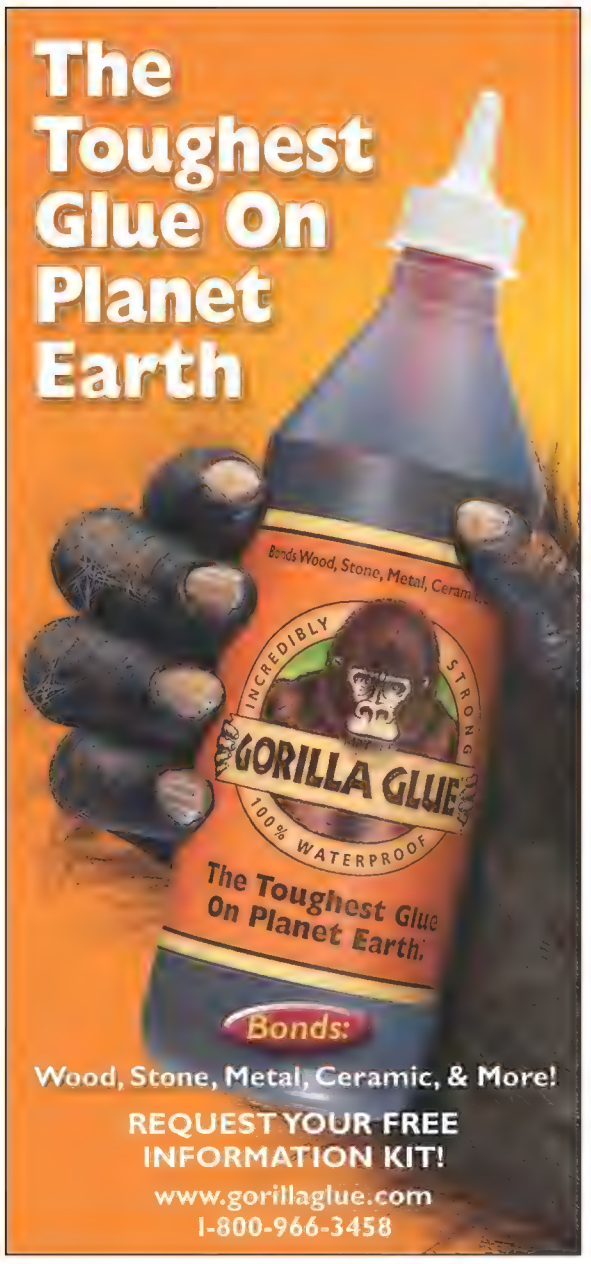

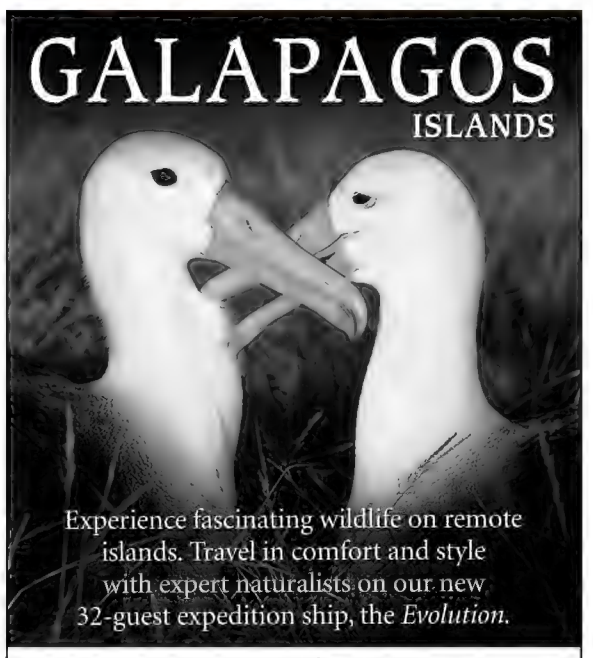
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Cornell Lab and the Arkansas chapter of the Nature Conservancy. More than 50 biologists took to canoes and kayaks, looked down from aircraft, or perched atop an 80-foot boom crane along the edge of the swamp. They hunched under camouflage netting in small blinds, and seeded the woods with automatic cameras and high-tech audio-recording devices.

For 14 months, the crew labored in often appalling conditions—winter's deep, bone-damp cold, and summer's heat, stifling humidity, swarming bugs and venomous cottonmouths. The searchers' families, in some cases even their spouses, knew nothing of the mission. A three-page memo, issued to each team member, advised how to deflect interest and quash rumors without actually lying. Over predawn coffee or late evening meals in local diners—anywhere other than the team's two base camps—mud-splashed crew members referred only to "the bird" or its code name, "Elvis." If anyone asked, they were simply doing a major biological inventory of the Big Woods.

My role in the drama was a minor one. The Nature Conservancy had hired me to document the search by writing an article for its magazine timed to coincide with the announcement of the bird's discovery. Although I'm now free to tell the story elsewhere, at the time I was constrained by the same pledge of secrecy as the rest of the crew. Everyone realized that if word leaked out, birders would stampede to the forest, hoping to add the woodpecker to their life lists, and greatly complicate the mission. They also knew that skeptics would demand ironclad proof in the form of photographs or recordings.

The secrecy also allowed the Nature Conservancy and Cornell to raise nearly $10 million and quietly buy up ivory-bill habitat, adding to the more than 120,000 acres of the Big Woods that the conservancy had already protected over the previous two decades. (The immense forest, about half of it now preserved as federal or state wildlife refuges, is also home to black bears and the world's largest wintering population of mallards.)

By 1944, all of the Singer Tract ivory-bills (a male in 1935) had vanished.

Getting proof of the ivory-bill's existence was harder than anyone expected. All told, team members glimpsed the bird fewer than two dozen times. (I wish I could say one of those glimpses was mine, but Elvis eluded me.) They made recordings of what sounded like the unique double-rap drumming of an ivory-bill, but pileated woodpeckers may, on rare occasions, make similar sounds. Likewise, the *kent-kent* calls caught on the automated recording units may have been an ivory-bill—or may have been an unusual blue jay call.

The clincher was a video made in April 2004 by David Luneau, a professor of electronics at the University of Arkansas and a member of the Big Woods search team. Luneau took me, moving silently in a canoe rigged with an electric trolling motor, to the spot where he and his brother-in-law got just three or four seconds of video as the ivory-bill flew away. Still, it was enough to clearly show the enormous patches of white on the rear half of the wings and bands of white on the back—proof that this was no mere pileated woodpecker.

Even after I had spent days in the forest, canoeing with team members or sitting quietly alone on an observation platform, listening to the whooping of barred owls, I sometimes found it hard to believe the object of the hunt was real. One afternoon I was paddling with

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Martjan Lammertink, a woodpecker expert from the Cornell Lab of Ornithology, when I noticed a tupelo tree trunk with a hole the size of a dinner plate chiseled into it, wood chips floating on the brown water below. When I asked if that was an ivory-bill's work, he shook his head. "No," he said, "when an ivory-bill cuts, it's more like a"—but I missed the rest of his reply. The simple fact that he used the present tense to refer to a species synonymous with extinction short-circuited my ears.

SO FAR, no one in Arkansas has reported seeing more than one ivory-bill, always apparently a male, always alone. Could this be the last of his kind, a cruel taste of hope before the candle goes out? Maybe, but none of those who have been chasing Elvis through the Big Woods think it likely. If the woodpecker has lasted more than 60 years without our knowledge, the chance that we've now stumbled upon its very last member is remote. The searchers have combed only a small fraction of the huge and challenging swampland, and have yet to find his core territory or nighttime roost holes. Ivory-billed woodpeckers can live up to 30 years, so at least one pair were breeding in the past two decades. The odds are that a small, highly endangered population of ivory-bills exists.

And there is another, far more potent reason for hope. I've birded all over the country, but the Big Woods area was a revelation to me—a vast, beautiful chunk of wild land. The Southern bottomland hardwood forests of flooded cypress and tupelo swamps, and the seasonally wet uplands of oak and sweet gum, were some of the continent's greatest landscapes. Their destruction was one of our great conservation tragedies. By World War II large tracts of forest were cut almost to the last stick, but they have, to a remarkable degree, risen anew from that wreckage. The trees are still relatively young compared with the 1,000-year-old monsters that once grew there. But in this part of the world trees grow fast, and some of the second-growth is now a century old.

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And if the ivory-billed woodpecker has survived in the Big Woods, maybe—just maybe—it has survived elsewhere. "You know why I think there have been so many ivory-bill sightings the last few years?" Bobby Harrison asked me as our canoes drifted side by side through the Cache. "I think they're getting more common. The habitat is there, and I think the birds are too."

Rumors of ivory-bills in the Atchafalaya—at 800,000 acres, the largest bottomland hardwood swamp in the United States—have persisted since those disputed photos in 1971. People claim to have seen the bird in half a dozen or more places around the South—the Apalachicola River, Wekiva River and the Fakahatchee/Big Cypress Swamp in Florida, the Congaree Swamp in South Carolina, the Pascagoula and Yazoo rivers in Mississippi, and the Pearl River in Louisiana. If the hunt in Arkansas holds a particular lesson, it's that this is a surpassingly elusive bird, more like a will-o'-the-wisp than a living animal.

One reason previous ivory-bill sightings have been discounted is that ornithologists didn't expect the bird to be so shy. Ornithologist James Tanner studied the last known ivory-bill population in Louisiana in the 1930s and found the birds to be conspicuously noisy during the non-nesting season and rather tame in his presence. If such birds persisted, the thinking went, surely they would have been fairly easy to find. Now some experts speculate that the noisy, tame ones were all shot and only those that were wary around humans survived.

We don't yet know if there are other ivory-bills in other swamps, and for now just knowing the "Lord God" bird lives in Arkansas should be enough. But why not hope for the best? Hope suddenly doesn't seem to be in such short supply, and the Southern bottomlands, those plundered but resilient forests, suddenly seem a wilder, more complete place.

SCOTT WEIDENSAUL's book Return to Wild America *will appear later this year.*

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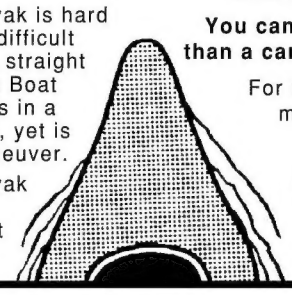

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BOOKS

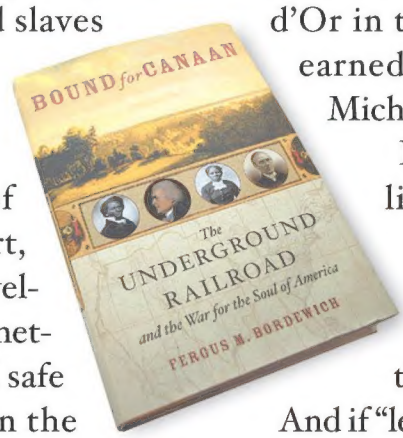
- TWO FROM OUR CONTRIBUTORS -

BOUND FOR CANAAN: THE UNDERGROUND RAILROAD AND THE WAR FOR THE SOUL OF AMERICA

FERGUS M. BORDEWICH

AMISTAD / HARPERCOLLINS, $27.95

THE CREATION of the Undergound Railroad is shrouded in the mists of legend. Now Fergus M. Bordewich tells the long and complex history of a growing movement that freed slaves and eventually changed the fundamental nature of the United States.



The "railroad" was, of course, nothing of the sort, but rather a gradually developed, ultimately complex network of secret routes and safe houses that gave slaves in the American South a way to escape to freedom.

Bordewich begins with the remarkable Josiah Henson, a "conductor" on the railroad who had been born into slavery and who "would eventually become one of the best-known African Americans of his time." Throughout *Bound for Canaan*, the author introduces us to people who, like Henson, took actions, either to free themselves or to free others, that were illegal and in most cases dangerous. The sum of their heroic efforts was a great, finally irresistible wave that crested in 1863 with the Emancipation Proclamation.

THE PERFECTIONIST: LIFE AND DEATH IN HAUTE CUISINE

RUDOLPH CHELMINSKI

GOTHAM / PENGUIN, $27.50

IN THIS METICULOUSLY reported book about the rise and fall of French chef Bernard Loiseau, we enter a world where the preparation of meals—memorable meals that can cost globe-trotting gourmands $1,000 or more for two—takes on near-cosmic importance.

In 1968, at the age of 17, Loiseau was hired as a lowly apprentice at a two-star restaurant in Roanne. There, his dutiful attention to detail, protean energy and admirable work ethic propelled him upward. Even though his training in classical cuisine was incomplete, he had, Chelminski writes, "vision to spare, along with a finely discerning palate that with the years was to develop into one of the best in the business."

By 1982, he had taken over La Côte d'Or in the town of Saulieu and earned a coveted three-star Michelin rating.

But for a perfectionist, life is never perfect. Loiseau's mania turned him into a rule-bound martinet (even though the rules were his own). And if "le style Loiseau" was delectable, it was also inflexible. When change, in the form of Asian fusion cuisine, began to sweep the kitchens of France in the late '90s, Loiseau resisted, with fatal consequences. The death in the book's subtitle came on February 24, 2003, when Loiseau—his business crippled by reduced travel after 9/11, his confidence shaken by a rumor that La Côte d'Or might lose its third star (a rumor he may inadvertently have started himself), his depression deepened by exhaustion—killed himself with a shotgun. Chelminski sees his subject as a tragic hero brought low by gimmicky chefs catering to crass appetites.

The Perfectionist should be read by anyone who cares deeply about the art of cooking and the passions that simmer behind closed kitchen doors. And once Chelminski stops selling the importance of French cuisine, even readers unconcerned about butter's role in 21st-century Paris will find the book compelling.

Reviewer OWEN EDWARDS is executive editor of the magazine Edutopia.

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GIVE WEEDS A CHANCE

HOW A CULTIVATED DISLIKE OF GARDENING
CAN LEAD TO MORE TIME ON THE PORCH **BY ANN HODGMAN**

"MOM, THE SUN is not your friend," my daughter once said to me. And being out in the sun is only one of the things I don't like about gardening. I also don't like digging (too dirty), dragging hoses around (too twisty), seeing leaves close up (too veiny) and accidentally cutting worms in half with a trowel (too messy). If I ever get more money than I can bear, I'll hire a gardener. Until then, I'm fine with a tattered lawn and a border of shrubs that my father once euphemistically called "primitive."

Well, not exactly fine. Actually, I'm ashamed of dodging America's favorite pastime. It seems furtive and unpatriotic to lie on the porch sofa reading mysteries while all around me, gardeners are sweating away their weekends lugging mulch and swatting gnats. On the other hand, why should I feel guilty? I'm the one holding the moral high ground. No one hates nature more than a gardener.

Here's a friend of mine, a very nice man, telling me that a woodchuck has invaded his suburban lawn. "I'd bomb his tunnel if I could find the entrance," he says. Another friend has planted a Concord grape arbor in one corner of her yard. To her amazement, the arbor has attracted raccoons. Although my friend has enough grapes to keep her family in jelly for centuries, she can't spare any fruit for the coons. "I asked the Audubon Society if it was OK to shoot them, and they said no!" she moans. "Do you believe it?"

Meanwhile, the main topic at local dinner parties is how to keep deer away from the day lilies, which deer chomp like lollipops. (Bags of lion hair? A flamethrower? A comet crashing into the earth?) Meanwhile, an Arizona relative who says she doesn't like the look of indigenous plants confesses that her traditional English garden uses an awful lot of water. Meanwhile, the droning of leaf blowers destroys tranquil summer days all across the nation. God forbid that a leaf should touch anyone's grass.

I'm not saying beauty is bad. Nor am I suggesting that all gardeners should be as happy to see a woodchuck munching their perennials as I would be. But planting a garden full of proven animal treats and then hating the animals that move in . . . Hey, why not set a freshly baked cake on the grass and then declare war on the ants swarming over it? The minute you plant a garden, wilderness starts trying to take advantage of it. Getting mad at the process is like getting mad at gravity.

"But flowers are prettier than pests," gardeners will say, without acknowledging that prettiness is entirely a matter of opinion. There's the truism about a weed's being a flower where you don't want it, or whatever. And I'd rather watch any kind of animal, even a snail, than any kind of flower, even a forest full of rare orchids. To me, a cottontail in the backyard provides more entertainment than a bunch of flowers. Plants just stand there with their feet in the dirt. And I can't look at them without seeing the work required to keep them standing there. At least it's less stressful to appreciate the living things that don't need special care—or special poisons—to stay alive. It's also prettier to see deer eating my yews and holly in the winter than to shroud all the bushes in brown burlap. (If deer are hungry enough to eat holly, I say they're welcome to it.)

"But we own this plot of land," gardeners will argue. "We have a right to keep it looking nice!" Why? Did Mother Nature sign a contract with them? We buy land from other humans. Why should we expect nature to respect our borders? Why not abandon the incongruity of taming a little patch of land while savagely battling nature to stay on the other side of the fence?

Gardening feels redemptive, which may account for the odor of sanctity exhaled by so many gardeners. It seems like a selfless act; you're improving your little corner of the world and working out at the same time. But gardening is just another luxury hobby, like getting a manicure or learning to make the perfect cassoulet. There's nothing wrong with fancy pastimes; if we can indulge in them, we're lucky. But we shouldn't make them the excuse for declaring war on the natural world. Summers would be a lot more peaceful if we sat back and smelled the roses—even if all we have is clover.

ANN HODGMAN, who lives in Connecticut, is the author of the holiday survival guide I Saw Mommy Kicking Santa Claus.

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